

A PICTORIAL SURVEY OF CURRENT PRACTICE, EQUIPMENT AND MATERIALS

Construction Methods

McGRAW-HILL PUBLISHING COMPANY, INC. • PRICE 25 CENTS

SMALL TOOLS
ON CONSTRUCTION



EQUIPMENT
REPAIR AND MAINTENANCE



OCTOBER, 1942

DOUBLE FEATURE THIS MONTH



"Gertie" was cut up and fed to the Inland furnaces the day she arrived at the mills.

"Old Gertie" Goes to War

Inland Mine Hoist Makes Scrap for Hungry Furnaces

To help meet the critical need for scrap, an auxiliary mine hoist once affectionately known as "Gertie," was taken out of retirement at one of the Inland ore mines and shipped to the company's mills at Indiana Harbor. The need for scrap is so urgent that "Gertie" was cut up and fed to the hungry Inland furnaces the day she arrived at the mill. She was rolled into steel plates and soon will be part of a Liberty ship carrying vital war supplies to the fighting fronts.

"Gertie" is typical of many pieces of equipment in factories, mines, etc. throughout the country. Replaced by a modern electric hoist several years ago, this old mine hoist was stored because it "might come in handy

some day." Holding old machinery, stacks, tanks, tools, jigs, dies, even partly finished parts, for possible future use is a commendable practice in ordinary times. But this is war—*total war*—and everything made of steel, that is not being used to produce for war, ought to be scrapped and started on its way to the steel mills at once.

Many steel mill furnaces are down, while millions of tons of needed scrap remain unreclaimed. The scrap situation is critical now and it will become more critical as winter approaches, unless management of American industry gives authority to scrap old equipment and materials.

If you can't use it *now*—scrap it.

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CURRENT JOBS

.... and Who's Doing Them

BUILDINGS

Public—An industrial plant is under construction in Ohio by **Holmes Construction Co.**, of Wooster, for \$20,000,000, to be financed by Defense Plant Corp. **John A. Johnson & Sons**, of Brooklyn, N. Y., and **Andrew Christensen**, of Elizabeth, N. J., were awarded a building contract in New Jersey, estimated to cost more than \$5,000,000. Contract for manufacturing plant expansion in Alabama went to **C. G. Kershaw Contracting Co.**, of Birmingham. **Walter Butler Co., Inc.**, of St. Paul, Minn., and **Engineers, Ltd.**, of San Francisco, Calif., at an estimated cost of more than \$5,000,000. **United Engineers & Constructors, Inc.**, of Philadelphia, will design and construct manufacturing plant in Pennsylvania, for over \$5,000,000. Buildings are under construction in Kansas by **Metcalf & Hamilton**, and **Kansas City Bridge Co.**, of Kansas City, Mo., for approximately \$3,000,000. In Louisiana, plant expansion contract was awarded to **Commercial Solvents Corp.**, of New York, estimated to cost over \$3,000,000. **Nathan Fish and N. L. Bien, Inc.**, of Chicago, Ill., are building demountable housing units in Illinois, for \$2,345,000. Industrial plant will be built in Tennessee by **Lummas Co.**, of New York City, for approximately \$2,000,000. Defense Plant Corp. will finance.

Temporary frame buildings are under construction in Nebraska by **Peter Kiewit & Sons Co.**, and **Geo. W. Condon Co.**, of Omaha, to cost between \$1,000,000 and \$5,000,000. **Norgaard & Shaw, Villbig Bros., Inc.**, and **Nathan Wohlfeld**, of Dallas, Tex., were awarded contract to build naval air station in Texas, for \$3,366,667. Industrial plant in Tennessee is under way by **Hegeman Harris Co., Inc.**, of New York City, at estimated cost of more than \$3,000,000. Contract for the construction of temporary frame buildings, clearing, grading and paving in South Carolina went to **V. P. Loftis Co.**, of Charlotte, N. C., for approximately \$5,000,000. **Wm. Linker Co., Inc.**, of Philadelphia, Pa., was awarded building contract in New Jersey, to cost between \$1,000,000 and \$5,000,000. In Arkansas, contract for temporary frame buildings and water distribution system was awarded to **Magnolia Construction Co.**, of Jackson, Miss., at an estimated cost of \$5,000,000.

HEAVY CONSTRUCTION

Improvements are being made in Maryland by **Brann & Stuart**, of Philadelphia, Pa., for \$3,000,000. **Sauer-Weiner & McClusky**, of St. Paul, Minn., were awarded contract to make improvements in Missouri, at estimated cost of \$2,000,000. Contract for buildings and improvements in Kansas went to **Busboom & Bauh**, of Salina, for \$2,000,000. Improvements and grading contract in Missouri was awarded to **Harper Construction Co.**, of Great Bend, Kan., with bid of \$2,000,000. Sewerage system to cost between \$1,000,000 and \$5,000,000 in New Jersey, is under way by **Chas. F. Vachris, Inc.**, of Brooklyn, N. Y. **Elmhurst Contracting Co.**, of Corona, N. Y., will build taxways in New York, to cost between \$1,000,000 and \$5,000,000. Improvements contract in Missouri went to **Jensen Construction Co.**, and **Leck Construction Co.**, both of Minneapolis, Minn., for approximately \$5,000,000. Runways in Louisiana, to cost between \$1,000,000 and \$5,000,000, are under construction by **The Jones Bros.**, of Montgomery, Ala. Low bidders for improvements and grading contract in New Mexico were **Nolan Bros.** and **C. A. Wagner Construction Co., Inc.**, of Minneapolis, Minn., with bid amounting to approximately \$5,000,000.

HIGHWAYS

Among recent highway contract awards are the following: California: \$258,985 to **Granite Construction Co.**, of Watsonville; \$336,340 to **Union Paving Co.**, of San Francisco. Kansas: \$500,000—\$1,000,000 to **Geo. Bennett Construction Co.**, of Kansas City, Kan.; \$1,000,000—\$5,000,000 to **L. V. Hotes**, of Kansas City, Mo., and **Grant A. Stannard**, of Wichita, Kentucky; \$600,684 to **Codell Construction Co.**, of Winchester, Indiana; \$509,167 to **Calumet Paving Co.**, of Indianapolis; Michigan: \$1,000,000—\$5,000,000 to **M. J. Boyle**, of Chicago, Ill. Nebraska: \$1,000,000—\$5,000,000 to **Ed. H. Honnen Construction Co.**, of Colorado Springs, Colo.; \$1,000,000—\$5,000,000 to **C. W. Roberts**, of Lincoln, New Jersey: \$901,732 to **J. P. Burns**, of Dumont, New York: \$500,000—\$1,000,000 to **Sicilian Asphalt Paving Co.**, of New York. Pennsylvania: \$500,000—\$1,000,000 to **Service Corp.**, of Camp Hill. South Dakota: \$1,000,000—\$5,000,000 to **J. W. Craig Co.**, of Minneapolis, Minn.

DOUBLE FEATURE THIS MONTH

This issue of *Construction Methods* features in text and illustration two subjects of particularly timely interest to contractors and engineers:

1. Equipment Maintenance and Repair
2. Small Tools on Construction

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PUBLICATION

The HOW of it

For the benefit of readers concerned with the practical application of method or equipment the following references are to articles or illustrations in this issue that tell:

- How **SMALL TOOLS** were used for a variety of purposes at Shasta Dam. —p. 39
- How **EQUIPMENT REPAIR AND MAINTENANCE SERVICE** is provided by equipment distributors. —p. 42
- How **CLEANING OF CONSTRUCTION EQUIPMENT**, before and after rebuilding, is done with steam nozzle. —p. 43
- How **MACHINE SHOP** is equipped to handle repair work. —p. 44
- How **TRACK PINS** on tractor track rails are removed for repair by hydraulic press. —p. 45
- How **ELECTRIC WELDER** in distributor's shop salvages sprocket that might otherwise be wasted. —p. 45
- How **TESTING EQUIPMENT** is used to check diesel pumps and injectors during repair and rebuilding operations. —p. 48
- How **BROOM CORES** on power-driven street sweepers are filled in repair shop. —p. 48
- How **WIRE ROPE** is measured and cut off to desired length by special machine. —p. 50
- How **CLUTCH AND BRAKE BANDS** are riveted with automatic self-feed machine. —p. 51
- How **REPAIRS TO TRACTOR TRACKS** are made in shop with special tools. —p. 52
- How **WELDING TRUCK** is maintained for making on-the-job repairs to construction equipment. —p. 52
- How **CONTRACTOR'S CENTRAL SHOP** maintains and repairs earth-moving equipment. —p. 54
- How **HIGHWAY TUNNEL** was lined with timber in order to conserve steel. —p. 56
- How **WRONG-WAY DRIVING** is made difficult at intersections by low barriers. —p. 56
- How **TRACTOR-CRANE** is used to erect radio antennas. —p. 57
- How **STEEL MATS** are placed to form emergency airfield runway surfaces. —p. 57
- How **SMALL TOOLS** speeded construction of Army cantonment. —p. 58
- How **JOB MAINTENANCE** keeps motor trucks in service. —p. 61
- How **SMALL TOOLS** are applied in a variety of ways on construction work of all types. —p. 66

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The Chemical Engineer cuts years to months...

Born in the turmoil of the last war, he is shaping a new world with mighty swords and magic plowshares

GERMAN CONSUL-GENERAL HOSSENFELDER, writing from New York on March 3rd, 1916, to von Bethmann-Hollweg, chancellor of the Imperial German Government, confidently predicted defeat for the United States because we were totally dependent upon the great chemical industry of Germany. "Americans," he wrote, "can never establish such an industry. They have the resources but they lack the necessary science and technology. And, besides, the conflicting selfishness of American business renders it impossible."

Even before the ink was dry on Hossenfelder's letter a new figure appeared on the industrial scene—the American chemical engineer. With the help of patient, but progressive and venturesome capital, he laid the foundations for the largest and most resourceful chemical industry in the world.

Today he is an all-important figure. For we are fighting a chemical war, even though the emphasis that is placed on planes, tanks, ships, guns and other armament tends to obscure that fact. And this chemical engineer is waging war for us on a prodigious scale. Bombers carry more tons of more deadly explosives because he has developed stronger and lighter alloys and more efficient fuels. Tanks are better armored and wield heavier blows because of products and processes born in chemical laboratories. Ships are welded together by new metallurgical techniques that save precious months over older processes. Gun barrels that are made in minutes instead of hours shoot farther and faster because of better ammunition.

And quantity keeps pace with quality. By mid-year of 1942, explosives were being produced in newly constructed plants twelve times faster than a year ago. Smokeless powder output has been doubled since December. Five times as much TNT was being made in July as in the months preceding Pearl Harbor. One single new plant produces more of this high explosive than did the entire pre-war industry—and several of these plants already are in production.

By what Major General William N. Porter, Chief of the Chemical Warfare Service, calls a "miracle of production," the sort of incendiary bombs that General Doolittle's lads showered on Tokyo were rolling out of our plants within a few weeks after we got into the war. As General Porter puts it, "they were rolling not by hundreds or even thousands, but by the millions." That record he has cited as a tribute to the "ingenuity, industriousness and patriotism" of the American chemical industries.

Yet the General agrees that we have only started to produce in the tremendous volumes that will shortly make Germany, Italy and Japan "revolve on their boasted Axis." Our newest plants are just coming into production. They face no limiting shortages of materials for, in the main, our chemical industry draws its strength from coal, salt, sulphur, limestone, oil, natural gas, coal-tar, air and water—all available in abundance.

We have heard little about the use of poison gas by our enemies. It may be that good reasons for this are stored away in our well-stocked chemical arsenals. American chemical manufacturers have worked hard and long with our armed forces so that if the time ever comes to make good on the President's warning of retaliation, America will be more than ready.

And defense against gas has not been overlooked. Every soldier is equipped with a most efficient type of gas mask, developed through twenty-five years of intensive research. The Chemical Warfare Service already is manufacturing millions of masks for distribution to civilians. Let us hope we may never have to use them. But if we must, we need have little fear of any gas or secret chemical.

This gas mask program has been made possible by a literal metamorphosis of production facilities, as peacetime industries have been converted to war purposes. A lumber company, for example, is making activated carbon from sawdust. Novelty manufacturers of rubber goods are turning out valves and assembling other parts. Former manufacturers of shirts, swim-suits, shoes and beds have converted their facilities and are contributing their share. More than eleven hundred contractors and two hundred and fifty sub-contractors are supplying their full quotas of chemical warfare materials. And production is right up to schedule.

But the bulk of the war job of our chemical industries has to do with items other than weapons and ammunition. The German Consul-General, in that 1916 report to Berlin, said that many American industries were in a critical condition because of the scarcity of German chemicals. He related in particular that "the cries for help from the world of physicians are becoming louder and louder and more and more insistent." Thanks to our chemical industries this cry no longer is heard. Even though we are again cut off from quinine, camphor and some other strategic medicinals, our homes and hospitals are adequately supplied with synthetic products. Most of these are better and cheaper than the natural materials. The same sulfa drugs that have saved so many civilian lives in recent years have gone to war, with the result that deaths from infection at Pearl Harbor and Bataan are reported as surprisingly low. In this war we suffer no shortages of iodine and potash. Pioneering research in the field of vitamins has led to new industries that are contributing to health and better nutrition.

Those new uniforms the soldiers are wearing are of better quality and will last longer than the shoddy, ill-fitting outfits of 1918—thanks to sunfast dyes and new man-made products. And in the field of fabrics, nylon and the new rayons have gone to war in parachutes and super-strong cords for tank treads and tires.

And that brings up the question that 30,000,000 American motorists are asking with ever increasing concern. "When, Mr. Chemical Engineer, are you going to give us a set of new tires for the old family bus?"

That, I am told, is just what the chemical engineers have set about to do on a scale that is difficult to comprehend. In the words of Raymond Clapper, the columnist, "the synthetic rubber program for this year and the next is the biggest job of chemical engineering ever undertaken in the world." A billion dollar industry is being built at record speed to make almost a million tons a year of chemical rubber to serve our war needs and those of our allies. This cannot be accomplished overnight. Many months are required to design and fabricate complex equipment, much of which must be made from corrosion-resisting metals and

alloys. We shall be lucky if a tenth of the desired capacity is in continuous production this year and even more lucky if, by the end of next year, the new industry should be turning out synthetic rubber at a rate of 875,000 tons—using both petroleum and grain as raw materials.

All this, of course, must go for essential military uses but there is reason to believe that in the laboratory and pilot-plant stages we have some promising substitutes and stop-gap materials that may tide us over until the big program starts rolling.

The present prospect of real success is possible only because of the cooperation of the chemical, rubber and petroleum industries. Individual firms and entire industries have set aside their normal desires and selfish interests to pool their patents, share their research and engineering developments for the common good. Synthetic rubber is here to stay as the basis for a great post-war industry: no doubt as to that lingers in the minds of the men who have seen many other natural products—indigo, alizarine, camphor, vanillin—all eventually fall before the ingenuity of the chemical industry.

In the coming peace to which we look forward hopefully, we shall find a new world full of new materials, new conveniences, new jobs, new opportunities, all stemming out of the present-day work of the chemical engineer. The same tough, transparent plastics that now make noses for bombers will give us new frameless windows for our homes and automobiles. With capacity to produce at least 2½ billion pounds of aluminum, which is five or six times pre-war production, and a magnesium capacity 50 or 60 times the pre-war figure, many new uses will develop for these structural materials of great strength and amazing lightness. Almost anything that flies, runs, moves, or otherwise is motive, will have a place for them. New fibers such as nylon and vinyon had scarcely got started before they were put to war use. Once the war is over they will be with us in greater abundance and at lower cost for a variety of uses so vast and so diverse that we can scarcely imagine them.

And the chemical engineer continues to create and to invent. He meets the challenge of scarcities and shortages with ever new "substitutes" that excel their originals. Even before the war is over he will have placed at our command a hundred new materials which we did not have before. His workshop is all industry. His contributions are as limitless as are our needs.

But right now his all-important job is to help win the war; to fight to a finish the ruthless and resourceful enemies that are devoting all their science and technology to bring about our defeat. So, as we take stock of our assets in this desperate struggle, we count among the first the proved resourcefulness of the research-minded chemical engineers we now have mobilized to help us fight this chemical war.

James H. McGraw, Jr.

President, McGraw-Hill Publishing Company, Inc.

This is the fourth of a series of editorials appearing monthly in all McGraw-Hill publications reaching more than one and one-half million readers.

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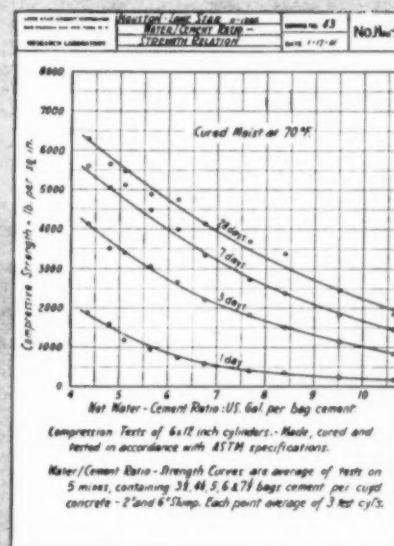
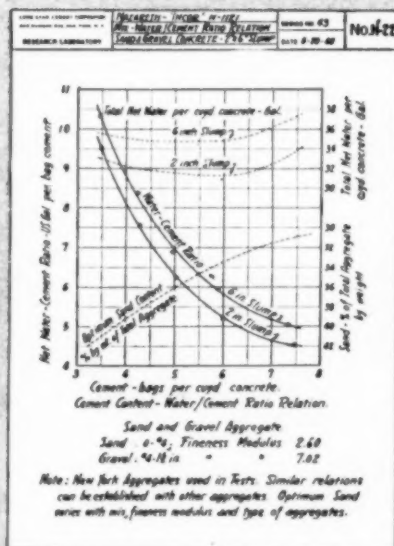
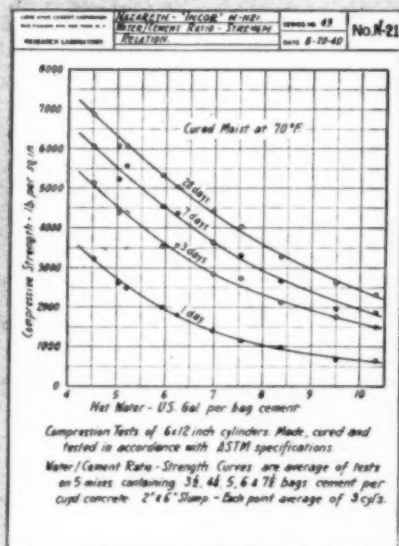
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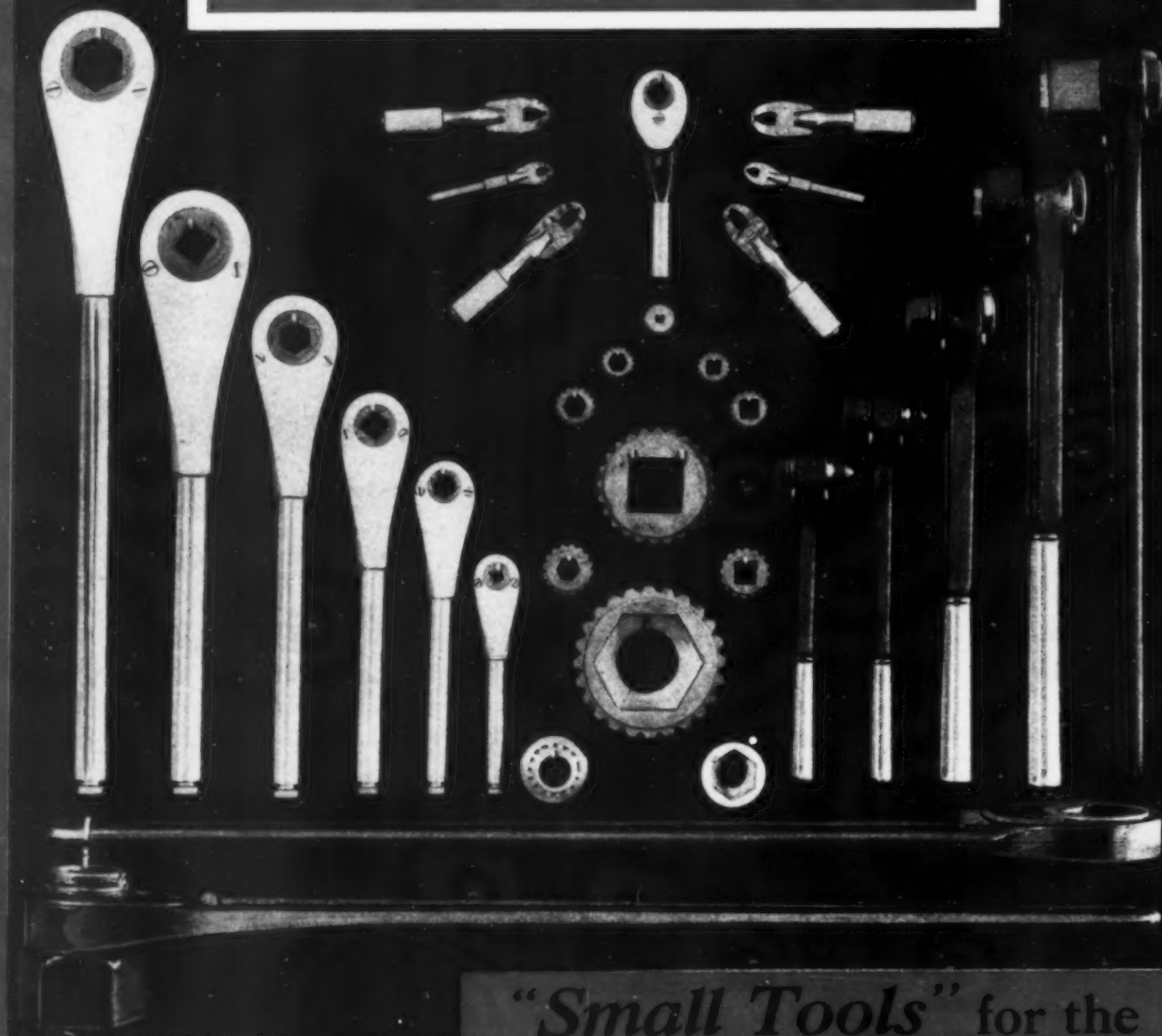
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And, proudly, Thor employees wear the "E" lapel pin.

Fully aware is every man and woman of Thor of the significance of the honor which has come to them. They regard it, humbly, as the symbol of a pledge upheld.

MONTHS ago, the men and women of Thor gathered in the shadow of the plant and made a pledge.

The pledge was, "We'll Produce the Plus." It was a pledge made solemnly by determined people who knew that the portable power tools they make would help to build the planes, the tanks and the ships with which the war must be won.

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For this reason, we look upon the award of the Army-Navy "E" as symbolic of a pledge upheld.

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not while a needed shell is uncompleted,
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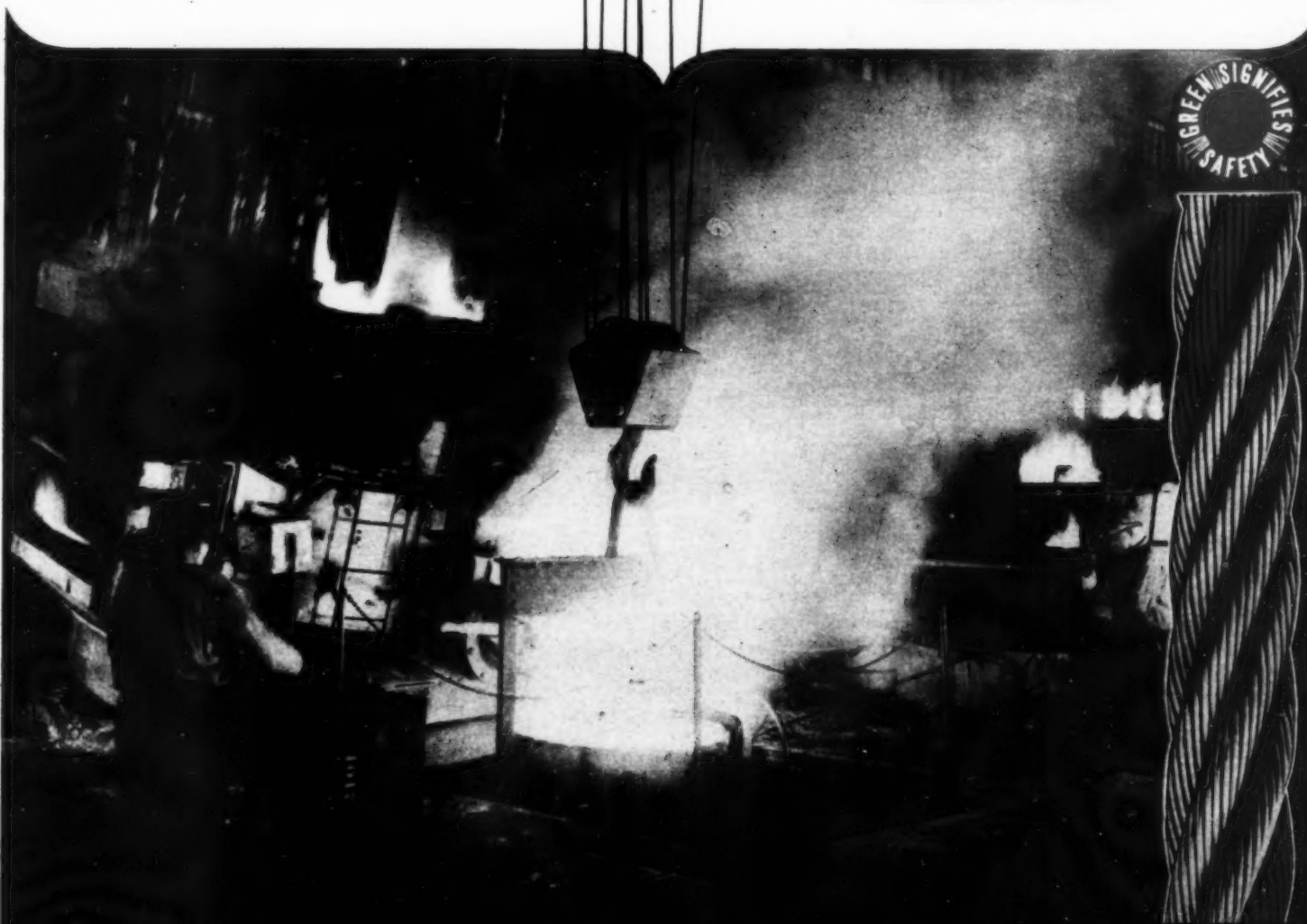
HAZARD LAY-SET *Preformed* LENDS A HAND

The job of LAY-SET PREFORMED WIRE ROPE in the steel industry is to lift, to haul and to hold. Huge shovels of raw ore, great ladles of molten metal, tremendous tonnage of finished steel ready to be fabricated, all depend on LAY-SET. You'll find it on power shovels, drag lines, scrapers, gantry cranes, ship hoists, car dumpers, overhead traveling cranes, electric hoists—doing more work at less cost with fewer accidents and delays.

HAZARD WIRE ROPE DIVISION

Wilkes-Barre, Pa. • Atlanta • Chicago • Denver • Ft. Worth • Los Angeles
New York • Philadelphia • Pittsburgh • San Francisco • Tacoma

AMERICAN CHAIN & CABLE COMPANY, Inc.
BRIDGEPORT, CONNECTICUT



HAZARD LAY-SET *Preformed* WIRE ROPE



A LITTLE MORE POWDER may conserve IRREPLACEABLE EQUIPMENT

MORE than ever today, using a little more powder is not necessarily a waste. The accent is on production—and on getting the longest, most efficient life from irreplaceable equipment.

Maybe you don't even need *more* powder, but do need the *right* powder. This, conceivably, could mean even less powder. Check up on your methods.

Well-shot rock handles faster. Increases production. Saves repairs, and time lost in repairs—because it reduces strain on your equipment.

Atlas urges cooperation in tackling the job we all face. We are ready and willing to do our part. A card in the mail today will start an Atlas Representative on his way to do what he can to help.

ATLAS

EXPLOSIVES
"Everything for Blasting"



ATLAS POWDER COMPANY, Wilmington, Del. • Offices in principal cities • Cable Address—Atpowco

*This
makes
the*

Seventeenth NORTHWEST

for
**MIDWEST
CONSTRUCTION
& ASPHALT CO.**
Chicago, Illinois



TOMORROW is going to be another day! Tomorrow more than ever before the quality and performance of your machinery is going to influence the success of the contracts you bid successfully. Watch the performance of Northwest Rock Shovels on emergency contracts today. Check the names of the concerns that are buying Northwests — not one or two but again and again.

Superior performance, the ability to keep running and the endorsement of leading contractors should go far toward convincing you that Northwest is the machine for successful contracts tomorrow.

Midwest Construction and Asphalt Co., Chicago, buy their seventeenth Northwest! Where can you find a better guide to your future plans and purchases!

NORTHWEST ENGINEERING CO.

1728 Steger Bldg., 28 E. Jackson Blvd.
Chicago • Illinois

Records like this

show why...



Pozzolith concrete used throughout this sewage treatment plant in Mansfield, Ohio. George B. Sowers, Consulting Engineer, Cleveland; Lowensohn Construction Co., Contractors, Cleveland.

"CONCRETE . . . SOUND AND PERFECT"

ENTHUSIASTIC approval of the performance of Pozzolith has resulted in many statements from leading engineers like the following:

June 5, 1912—"In the construction of the Mansfield, Ohio sewage treatment plant, built in 1936, Pozzolith produced a dense, waterproof concrete of high strength yet having sufficient plasticity for easy placing . . . Recently all of the concrete was cleaned and inspected and found to be in sound and perfect condition. There has been no disintegration, either from frost or sewage action, not even at the waterlines."

GEORGE B. SOWERS, Consulting Engineer.

Find out how Pozzolith produces greater speed, strength, workability, watertightness, durability and lower costs. Send for illustrated Pozzolith booklet and Research Papers No. 36—"Economics of Cement Dispersion" (for mass concrete) and No. 39—"Cement Dispersion and Air Entrainment" (for runways and pavement).

THE MASTER BUILDERS COMPANY

CLEVELAND, OHIO

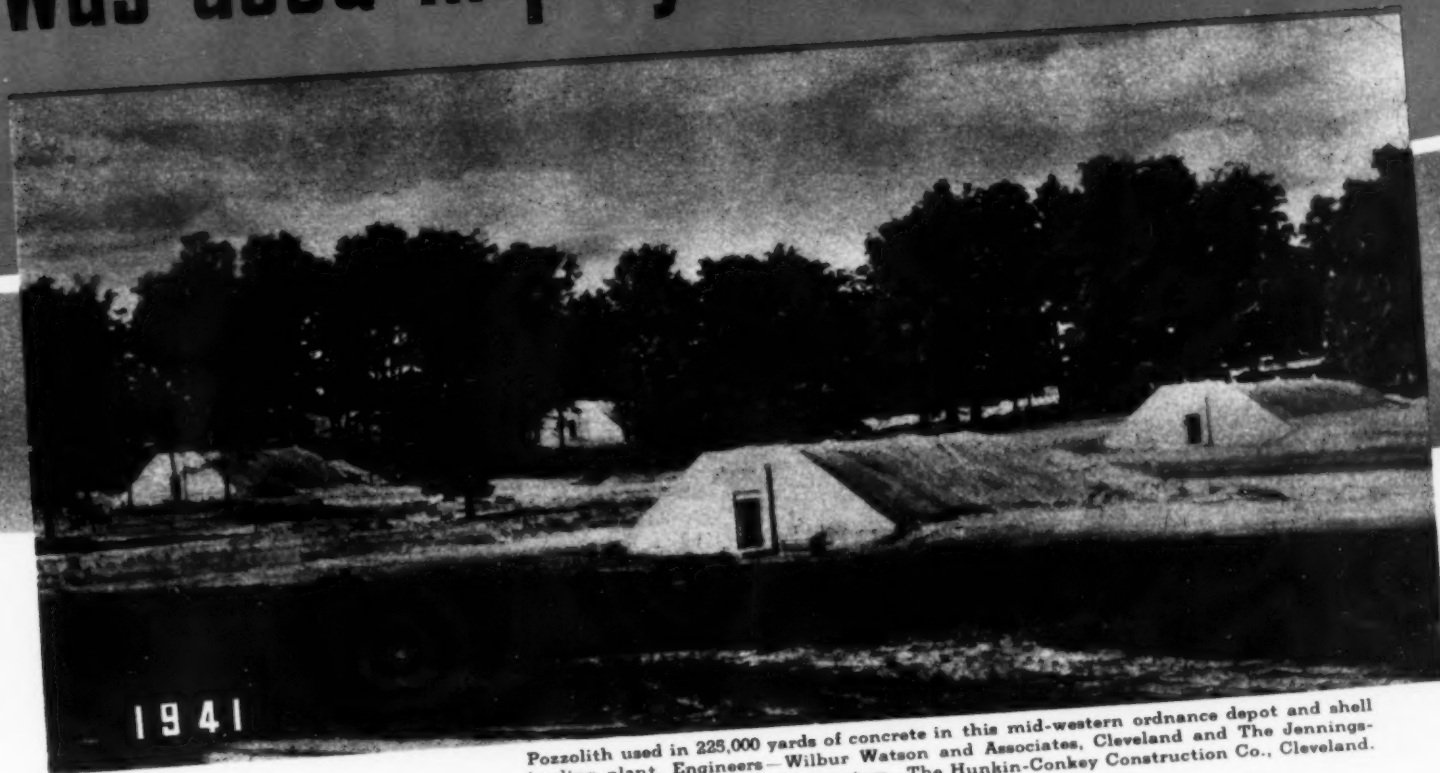
TORONTO, ONTARIO



MASTER

POZZOLITH (Cement Dispersion)

was used in projects like this—



1941

Pozzolith used in 225,000 yards of concrete in this mid-western ordnance depot and shell loading plant. Engineers—Wilbur Watson and Associates, Cleveland and The Jennings-Lawrence Co., Columbus. Contractors—The Hunkin-Conkey Construction Co., Cleveland.

WORKABILITY . . . SPEED . . . WATERTIGHTNESS

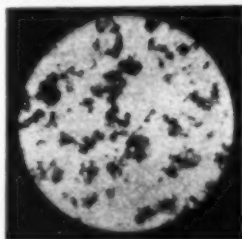
DESIRING increased workability to speed pouring of concrete igloos, plus low water-cement ratio to insure watertightness and durability, the builders of this ordnance depot specified Pozzolith.

Upon completion of this plant the resident engineer described their experience as follows: "We found that your claims for and our earlier tests of Pozzolith were fully substantiated."

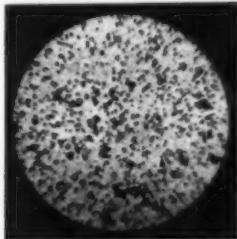
Pozzolith will help meet *your* requirements—investigate it.

HOW CEMENT DISPERSION WORKS

In a normal concrete mix, cement particles tend to bunch together, thereby (1) limiting hydration and (2) trapping water within the cement clumps. (See photomicrograph at right).



Cement suspended in water
UNDISPERSED
WITHOUT POZZOLITH



Cement suspended in water
DISPERSED
WITH POZZOLITH

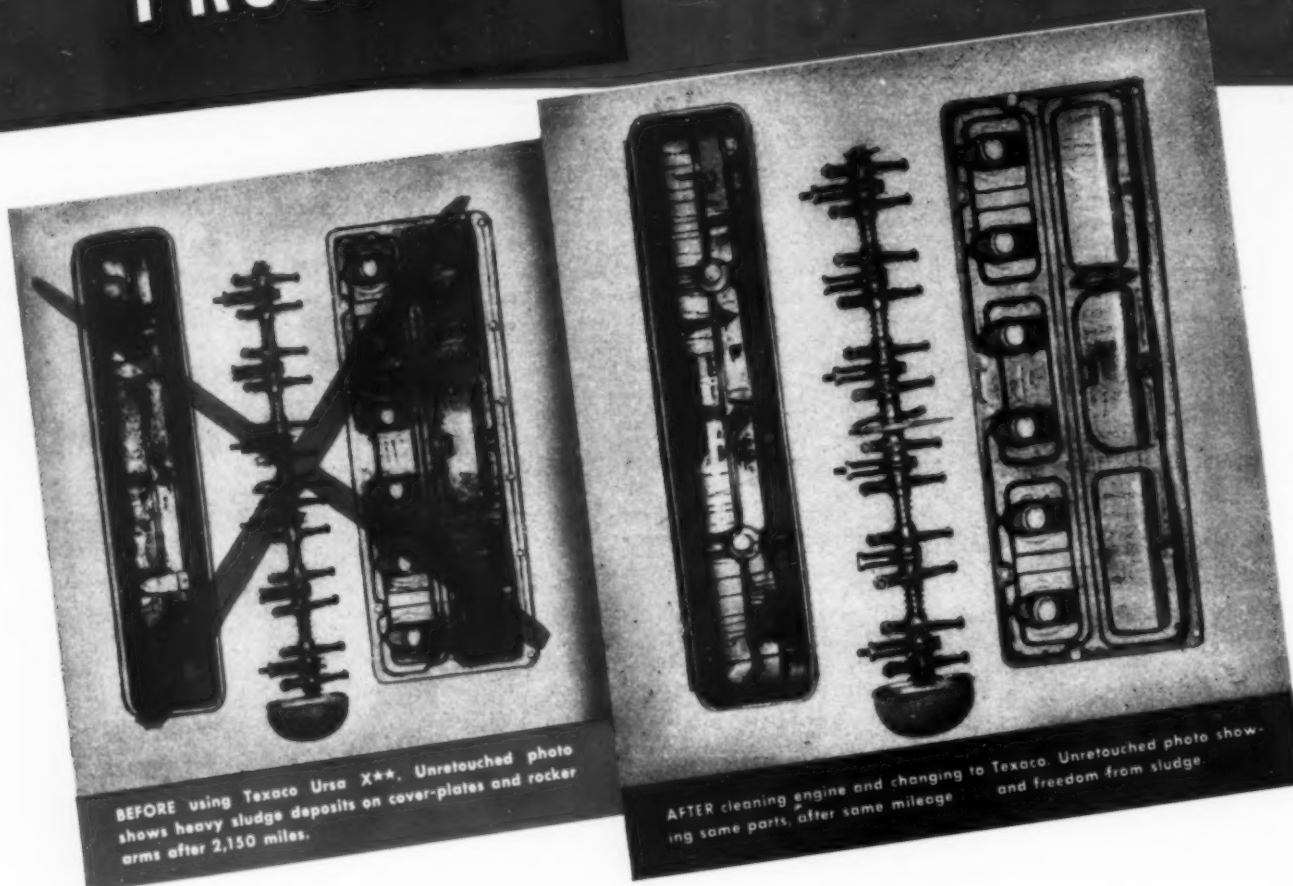
Cement Dispersion drives these particles apart and (1) exposes their entire surface area to hydration, at the same time (2) making the water entrapped in the clumps available for lubrication of the mix. (See photomicrograph at left).

BUILDERS



PHOTOGRAPHIC PROOF

THAT ENGINES STAY 3 TIMES CLEANER



AS THE larger unretouched photo shows, engines can be kept clean... assuring full power and maximum fuel economy . . . when lubricated with *Texaco Ursa Oil X***.

The exclusive use of *Ursa X*** keeps both Diesel and gasoline engine pistons, rings, valves and other parts 3 TIMES CLEANER than ordinary lubricating oils . . . by holding fuel soot and other deposit-forming materials in suspension so that they are drained away at regular oil-change periods.

Using *Ursa X***, oil lines and filters

also stay clean; modern bearings are protected in the heaviest service.

The outstanding performance that has made Texaco preferred in the fields listed in the panel has made it preferred on prominent construction jobs throughout the country.

These Texaco users enjoy many benefits that can also be yours. A Texaco Automotive Engineer will gladly cooperate... just phone the nearest of more than 2300 Texaco distributing points in the 48 States, or write to The Texas Company, 135 E. 42nd St., N. Y., N. Y.

THEY PREFER TEXACO

- * More revenue airline miles in the U. S. are flown with Texaco than with any other brand.
- * More buses, more bus lines and more bus-miles are lubricated with Texaco than with any other brand.
- * More stationary Diesel horsepower in the U. S. is lubricated with Texaco than with any other brand.
- * More Diesel horsepower on streamlined trains in the U. S. is lubricated with Texaco than with all other brands combined.
- * More locomotives and cars in the U. S. are lubricated with Texaco than with any other brand.

TUNE IN FRED ALLEN EVERY SUNDAY NIGHT—CBS

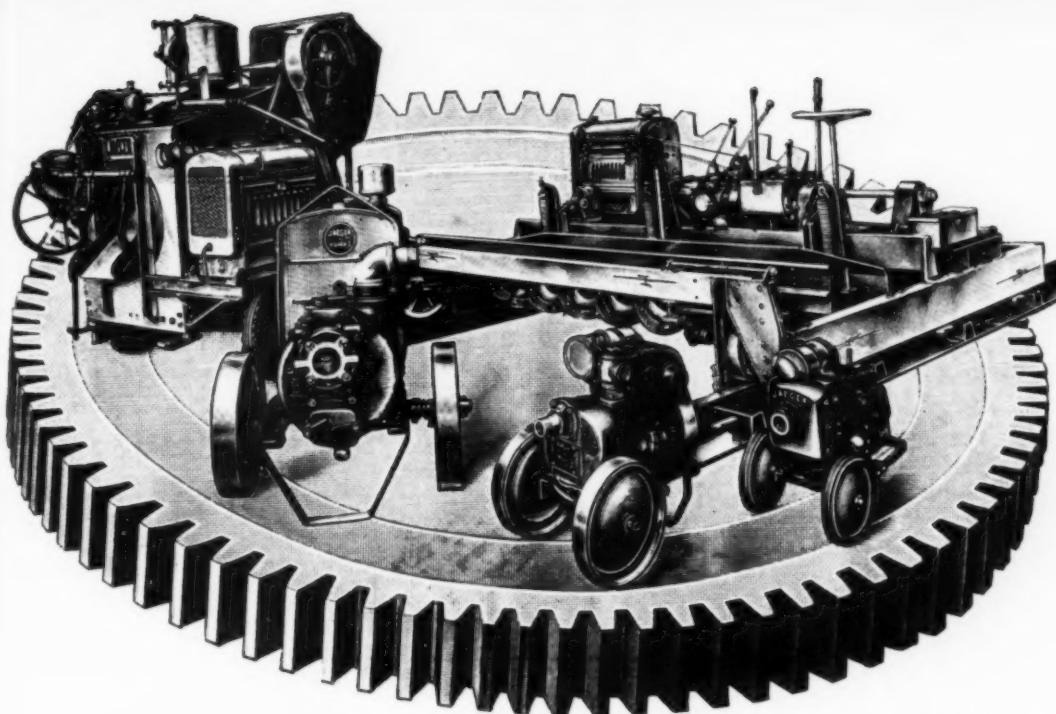


TEXACO Lubricants and Fuels

FOR ALL CONTRACTORS' EQUIPMENT

HELP WIN THE WAR BY RETURNING EMPTY DRUMS PROMPTLY

Mr. Contractor, WE'VE GOT WHAT YOU NEED



- 1: YOUR GOVERNMENT HAS URGENT USE FOR ALL IDLE CONSTRUCTION EQUIPMENT. WE WILL BUY, RE-SELL OR REBUILD YOUR WORTHWHILE IDLE MACHINES.
- 2: TRAINED EQUIPMENT MECHANICS, with factory shop facilities, and a full stock of repair parts.
- 3: NEW JAEGER MIXERS, PUMPS, HOISTS, ROAD MACHINERY for any important job, as long as our stocks hold out.
- 4: EQUIPMENT FOR RENT to contractors to meet many needs and priority problems.

As Near to You as Your Telephone

ALABAMA
BIRMINGHAM, Gantt Machinery Co., Inc., Ed.
MOBILE, Turner Supply Company
MONTGOMERY, Ray-Brooks Machinery Co.

ARIZONA
PHOENIX, Smith-Booth-Usher Company

ARKANSAS
LITTLE ROCK, Choctaw Culvert & Mach. Co.

CALIFORNIA
LOS ANGELES, Smith-Booth-Usher Company
SAN FRANCISCO, Bacon Company, Edward R.

COLORADO
DENVER, Moore Equipment Company, H. W.

CONNECTICUT
EAST HARTFORD, Hedge & Mattheis Company
WEST HAVEN, Hedge & Mattheis Company

FLORIDA
JACKSONVILLE, Moody, M. D.
MIAMI, Llewellyn Machinery Corp.
TAMPA, Cameron & Barkley Co.

GEORGIA
ATLANTA, Armstrong & Bro. Company, R. S.

ILLINOIS
CHICAGO, Arrow Contractors Equipment Co.

INDIANA
FORT WAYNE, Pioneer Coal Company
HAMMOND, Standard Equip. & Supply Corp.
INDIANAPOLIS, Deaney, A. F.
SOUTH BEND, General Equipment Company

IOWA
DAVENPORT, Arrow Equipment Company
WATERLOO, Waterloo Construction Company

KENTUCKY
LOUISVILLE, Wayne Supply Company, Roy C.

LOUISIANA
NEW ORLEANS, Fletcher Equipment & Supplies
NEW ORLEANS, Southern States Equipment Co.

MAINE
BANGOR, Hedge & Mattheis Company
PORTLAND, Hedge & Mattheis Company

MARYLAND
BALTIMORE, John C. Louis Co., Inc.
BETHESDA, John C. Louis Co., Inc.

MASSACHUSETTS
BOSTON, Hedge & Mattheis Co.
WEST SPRINGFIELD, Hedge & Mattheis Co.
WORCESTER, Hedge & Mattheis Co.

MICHIGAN
DETROIT, Burke, Cyril J.
DETROIT, Schuster Equipment Co.
GRAND RAPIDS, Keller Tractor & Equip. Co.

MINNESOTA
DULUTH, Standard Salt & Cement Co.
MINNEAPOLIS, Minneapolis Equipment Co.

MISSISSIPPI
JACKSON, Choctaw Culvert & Mach. Co.

MISSOURI
KANSAS CITY, Bublitz Machinery Company
ST. LOUIS, Allied Construction Equip. Co.

MONTANA
HELENA, Montana Powder & Equipment Co.

NEBRASKA
OMAHA, American Machinery & Supply Co.

NEW HAMPSHIRE
CONCORD, Hedge & Mattheis Company

NEW JERSEY
NEWARK, The Jaeger-Lembo Machine Corp.
RED BANK, Prather, Grafflin S.

NEW MEXICO
ALBUQUERQUE, Harrison Co., R. L.

NEW YORK
ALBANY (MENANDS), Kelley Co., Inc. E. B.
BUFFALO, Rupp Equip. Co.
CORONA, L. I., Jaeger-Lembo
Machine Corp.
PLATTSBURG, Jerry, Vincent S.
ROCKVILLE CENTRE, L. I., Jaeger-Lembo
Machine Corp.
ROCHESTER, Syracuse Supply Co.
SYRACUSE, Syracuse Supply Co.

NORTH CAROLINA
RALEIGH, North Carolina Equipment Co.
STATESVILLE, North Carolina Equipment Co.

OHIO
AKRON, Hardware & Supply Company
CANTON, Figley Company, The W. K.
CINCINNATI, Highway Equipment Company
CLEVELAND, Pattison Supply Co., The W. M.
DAYTON, Flack Equipment Company
GALLIPOLIS, Bischoff, R. E.
HAMILTON, Miami Equip. & Supply Co.
TOLEDO, Flack Equipment Company
YOUNGSTOWN, Stambaugh-Thompson Co.

OKLAHOMA
OKLAHOMA CITY, Wylie-Stewart Mach. Co.

OREGON
PORTLAND, Nelson Equipment Company

PENNSYLVANIA
ERIE, John F. Steiner
HARRISBURG, Standard Equipment Company
PHILADELPHIA, Service Supply Corporation
PITTSBURGH, Highway Equipment Co.
WILKES-BARRE, Standard Equipment Co.

RHODE ISLAND
PROVIDENCE, Hedge & Mattheis Company

SOUTH CAROLINA
COLUMBIA, Bell-Lott Road Machinery Co.

TENNESSEE
CHATTANOOGA, Osborne Equipment Company
KNOXVILLE, Osborne Equipment Company
MEMPHIS, Choctaw Culvert & Mach. Co.
NASHVILLE, McCarthy, Jones & Woodard Co., Inc.

TEXAS
DALLAS, Browning-Ferris Machinery Co.
EL PASO, Tri-State Equipment Company
HOUSTON, Browning-Ferris Machinery Co.

UTAH
SALT LAKE CITY, Jones Equip. Co. The C. H.

VERMONT
BELLOWS FALLS, Hedge & Mattheis Company
BURLINGTON, Strong Hardware Company

VIRGINIA
LYNCHBURG, Branch, Marion S.
NORFOLK, Hampton Roads Tractor & Equip. Co.
RICHMOND, Smith-Courtney Company

WASHINGTON
SEATTLE, A. H. Cox & Company
SPOKANE, Nelson Equipment Company

WEST VIRGINIA
CHARLESTON, Capital City Supply Company
CLARKSBURG, General Equipment Co., Inc.
HUNTINGTON, Banks-Miller Supply Company
WHEELING, Seabright Co., H. L.

WISCONSIN
MILWAUKEE, Boeckh Equipment Company

WYOMING
CHEYENNE, Wilson Equipment & Supply Co.

**JAEGER
DISTRIBUTORS
IN OVER 100 CITIES
ARE "GEARED UP" FOR
WAR SERVICE**

HERE'S HOW!

TO FINISH CONCRETE FASTER—

Whiteman MACHINES INCREASE YOUR LABOR CAPACITY 40%

The WHITEMAN "3-Step" Precision Method multiplies the capacity of your present concrete finishing crews by mechanizing each step — (1) SCREEDING, (2) FLOATING and (3) FINISHING. WHITEMAN Machines speed vital construction by overcoming labor shortages, saving time, cutting costs, while they pay for themselves on the job! With the WHITEMAN "3-Step" Precision Method your present crews can finish 40% more concrete every day — produce a slab far superior to that finished by hand.

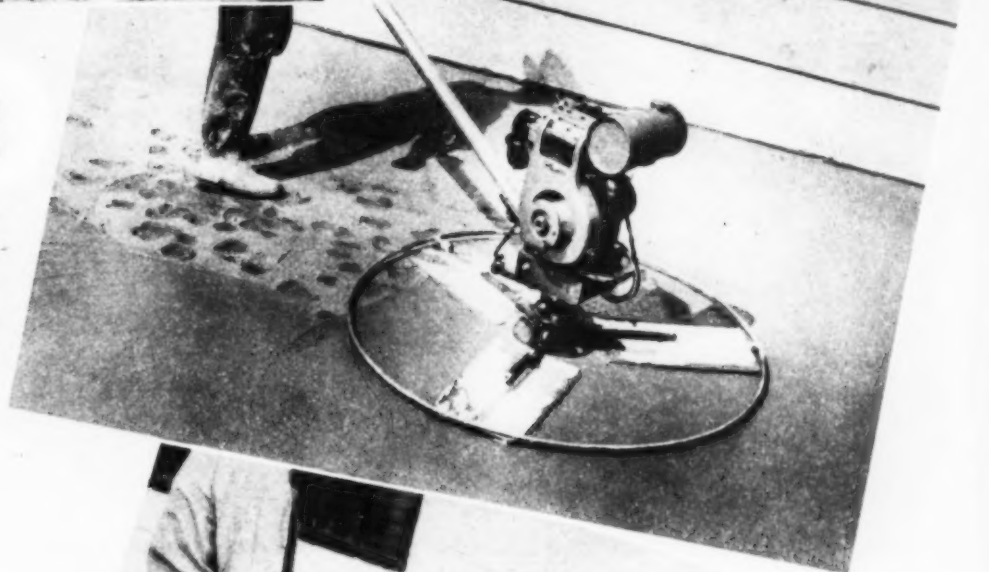
Here is what one superintendent who has finished over 1,500,000 sq. ft. of floor with WHITEMAN Finishing Machines, says about the results obtained with these machines: "On a recent job the mixing plant was started at 4:00 a.m. At 12:30 p.m. the plant was shut down and the pour finished. We put through 1,234 cu. yds. of concrete, spreading an area of 73,000 sq. ft. of 5-in. concrete floor. At 4:15 p.m. the floor was finished completely. In view of the fact Master Builders Floor Hardener also was used in connection with the finish, it is my opinion that it would have been impossible to have finished that large area in this time without the aid of the WHITEMAN Finishers and get the results we wanted — a level, hard finished floor."



1 SCREEDING — Experienced contractor-users report that 4 cu. yds. of low slump concrete can be handled easily in 5 minutes by the **WHITEMAN** Rodding Machine. A steady pull forward by the operator advances the machine while the power-operated screeds make 5-in. transverse strokes on the header boards, simultaneously leveling and compacting the mix.

FLOATING — When your concrete slab is ready for floating, the **WHITEMAN** Finishing Machine will give you a perfect float finish at high speed. Simply attach the "Heavi-Duti" 12-gage steel trowels to the **WHITEMAN** Finishing Machine, and with these strong, broad trowels, rotating while lying flat on the surface of the concrete, you can cover 1,000 sq. ft. in as little as 15 minutes. After the "floated" slab has set sufficiently it is ready for step 3.

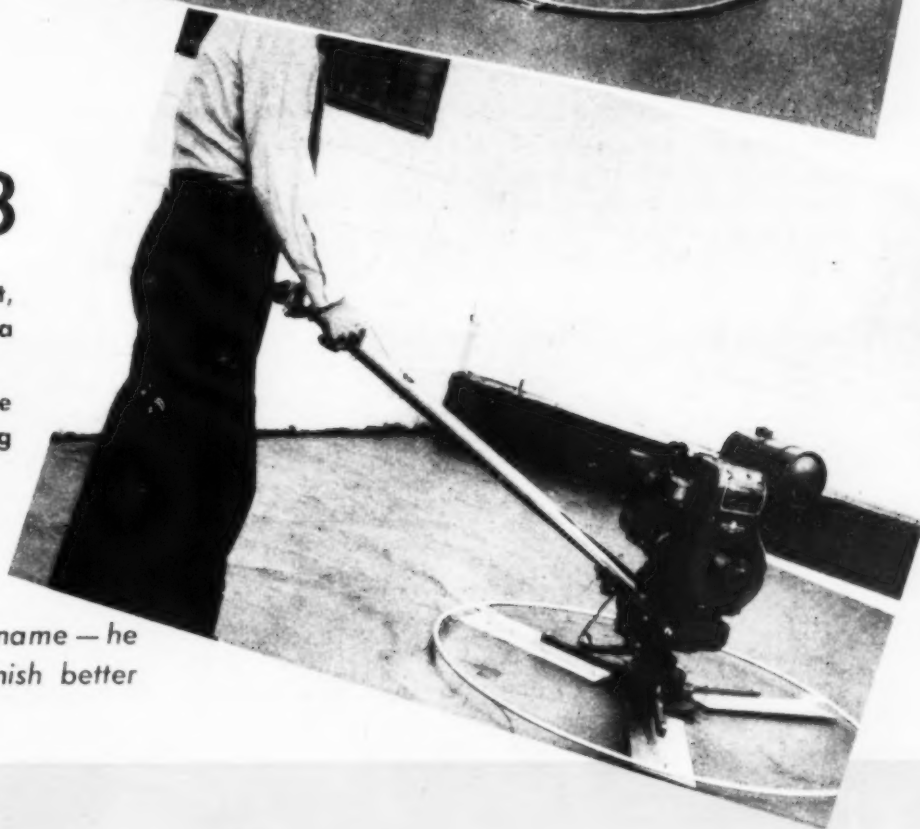
2



FINISHING — Using the same **WHITEMAN** Finishing Machine, with easily attached 17-gage steel "Finishing" trowels, you can again cover 1,000 sq. ft. in as little as 15 minutes. These light, flexible and adjustable blades quickly bring up a harder, denser surface, free of voids or laitance.

3

Remember, **ONE WHITEMAN** Finishing Machine takes care of both floating and finishing, thus saving equipment as well as saving time!



Write or wire today for your nearest distributor's name — he will show you how to conserve man-hours and finish better concrete.

Whiteman **MANUFACTURING CO.**

3249 Casitas Avenue

Los Angeles, California

PROTECT the Employee and SPEED Production

For 27 years Bethlehem has been waging war on the most dangerous saboteur of industrial production—accidents. Today, with the future of the nation so dependent upon top-speed production of war steel, we are stepping up the safety and

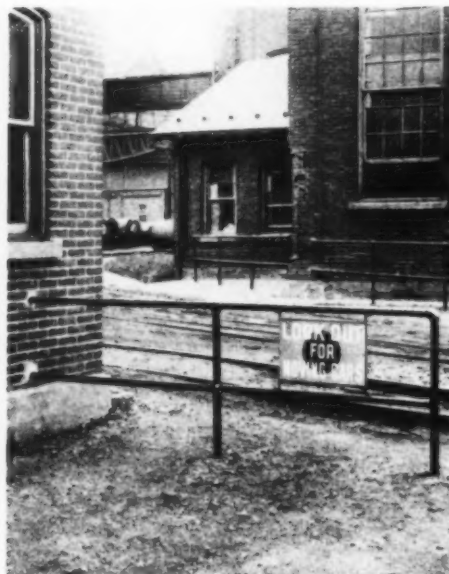
first-aid effort on a widening scale.

First-aid instruction is being given to thousands of employees. Established safety practices are daily being intensified. More safety shoes, goggles, helmets, respirators and fire-proof clothing. More warn-

ing signs and flags to mark danger spots. More safety posters to keep workers safety-conscious. . . . No detail is overlooked which can possibly contribute to the fast, efficient, safe production of steel for America's ever-growing war needs.



TOE-SAVING SHOES—Each of these five steel-reinforced safety shoes saved a foot from painful injury and kept one more worker on the job, fit, and able to continue doing his share to keep up the flow of Bethlehem's war production.



DANGER SPOT—But it's been rendered harmless by a short railing and a sign. Instead of stepping out blindly from the corner of the building, workers must cross the track at a point where they can hardly fail to notice an approaching train.



REHEARSAL—This team of first-aid men is giving treatment to an accident "victim" at one of Bethlehem's first-aid contests, held annually for many years. Thanks to this training, thousands of Bethlehem-trained first-aiders are constantly on the alert in steel plants and mines to prevent or treat industrial accidents.



SAFETY SCHOOL—By movies and lectures, Bethlehem employees are continuously being trained in the safest, most efficient methods of handling their jobs. Year after year, this education in the safe way to do every job goes steadily forward.



Open a "2ND FRONT"

Against **LOST TIME!**

Contractors, operators, owners of Lorain equipment—we call on you to take the offensive against lost time. This is a material-handling war—a heavy equipment war—and every hour your machine stands idle delays your country's "2nd front," and makes Victory that much harder.

How Lorain Distributor Service can help Avoid Time-Consuming Delays

Keep your Lorain at peak performance. Remember, the most expensive repair part is the one "not on hand," and many troubles can be avoided if spotted in time. Let your Lorain distributor *inspect* your machine at regular intervals. Let him *rebuild* parts in which normal wear is apt to cause trouble. Ask him for a copy of the *Thew Service Handbook* for your model Lorain . . . follow a regular schedule of *lubrication* . . . and if you need *spare parts* there are 31 Lorain distributors strategically located to give you quicker service on deliveries.

THE THEW SHOVEL COMPANY • LORAIN, OHIO



THEW-LORAIN

CRANES • SHOVELS • DRAGLINES • MOTO-CRANES



*"Colonel,
you're expected in Africa
... Saturday!"*



In fighting this global war America must send men and material over all the oceans to all the continents of the world.

Indispensable in the stupendous transportation job that this involves is Pan American Airways, whose mighty Clippers are flying military men, key officials and critical supplies to every far-flung front.

It is betraying no military secret to show, above, a PAA flying field under construction "somewhere in Africa". Nor to reveal that the cement used was Lehigh, as the bag to the left of the dozing native shows.

Lehigh Early Strength Cement has been used in countless war construction jobs, both at home and abroad, to save priceless construction time. For, when concrete must be made ready for service in a hurry, Lehigh's Early Strength Cement will do the job in 1/3 to 1/5 the normal time.

In wartime, speed is often Factor No. 1; but there are many other advantages besides speed that the use of Lehigh Early Strength Cement provides, which peace-time construction cannot ignore. Ask the Lehigh Service Department for details.

Lehigh

EARLY STRENGTH CEMENT

for service-strength concrete in a hurry

LEHIGH PORTLAND CEMENT COMPANY • ALLENTOWN, PA. • CHICAGO, ILL. • SPOKANE, WASH.

Lehigh gets in the scrap!

Since Pearl Harbor, Lehigh has salvaged and turned over to the war effort 19,155,959 lbs. of iron and steel scrap . . . 123,984 lbs. of copper and brass scrap . . . and 15,719 lbs. of rubber scrap.



DEPENDABLE

... At Home or
on the Battle front!



LaPLANT-CHOATE equipment is used on hundreds of jobs—here at home and on the far-flung fronts of the world. And there's a good reason why it has been selected for these jobs—dependability. You must have dependable, powerful, efficient machinery to fight a war. Only with such equipment can the job be done, done right and done on time!

Build a military road—carve out an airport—fill in a bomb crater! Those are fighting orders—the kind of orders LaPlant-Choate equipment carries out. For this is powerful, dependable equipment—the best that skilled workmen, working to proved design, can build with good materials.

Of course, the day is coming when the war will end—when it does, the same high-quality machines that have served you so well in the past will be ready to serve you again. Today they help to win the War and are so urgently needed by the armed forces that we can't make ordinary civilian deliveries.

In the meantime, we and our dealers are doing everything in our power to help you keep your machines at top efficiency. Skilled factory-trained men will help you obtain parts, make repairs. Call on your dealer—he can help you!



LAPLANT-CHOATE
Cable Address: LAPCHOATE Manufacturing Co. INC. Cedar Rapids Iowa, U.S.A.
EARTH MOVING - LAND CLEARING - SNOW REMOVAL EQUIPMENT

In shipyards, too COMPETITION FORCES OUR HAND

Everywhere you look in shipyards today, it's weld, weld, weld. Why the sudden, complete change to arc welding?

ALTER EGO: *Competition!* We were competing with enemy subs and bombers and they *forced* us to build good ships *faster*. We were *forced* to change to arc welding to beat the Axis competition.

Arc welding IS building ships faster, all right—more than twice as fast as the old method . . . just as it's speeding construction of tanks, planes and guns—making them better, too.

ALTER EGO: So look out now for the post-war Battle for Business. Competition will again force change to arc welding to produce better and cheaper autos, home appliances, houses, bridges and other products. We can be forced to change or we can be ready.

Let's put our designs on the alert now with arc welding so we'll get a head start on our competitors.

**Ask your inner self if competition
doesn't force your hand.**

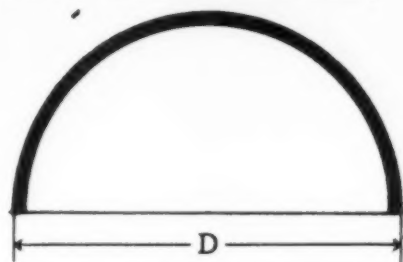
THE LINCOLN ELECTRIC COMPANY
CLEVELAND, OHIO



BLAW-KNOX STEEL FORMS...

.... in stock available for quick delivery

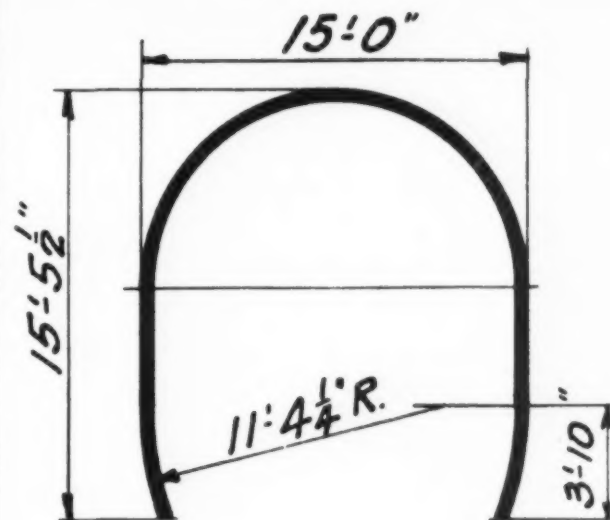
HALF ROUND FORMS



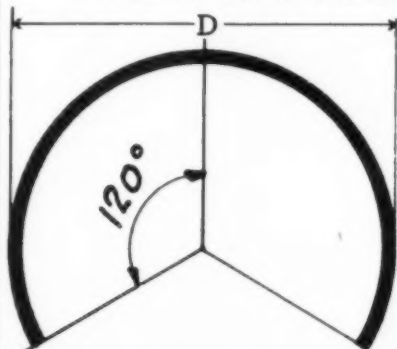
SOME OF THE LARGER SIZES WITH TRAVELERS

"D"	
2'-6"	6'-0"
3'-0"	7'-0"
3'-6"	8'-6"
4'-0"	10'-0"
4'-6"	10'-6"
5'-0"	12'-6"
5'-6"	14'-6"

FORM (As Shown)



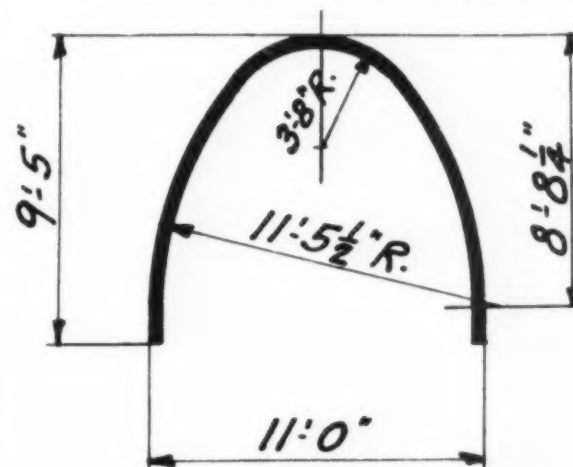
TWO-THIRDS ROUND FORMS



MOSTLY WITH TRAVELERS

"D"	
14'-0" FOR WOOD LAGGING	
12'-6"	9'-0"
10'-6"	7'-6"
10'-0"	6'-6"

SEMI-ELLIPTICAL FORM



VARIABLE THICKNESS



TRAVELING WALL FORM

These are used forms and are offered subject to prior sale. Complete information regarding them can be secured upon application. Phone, wire or write

BLAW-KNOX DIVISION of Blaw-Knox Company

(Phone Sterling 2700)
Pittsburgh, Pa.

GRUBBING OUT WILDERNESS LANDING FIELDS



Your "Caterpillar" Dealer is your Athey Dealer. He is geared to take care of your service needs. He offers specialized repair and rebuilding service, using only special tools, equipment, genuine parts and trained servicemen. See him for every service need!



ATHEY

Truss Wheel Co., Chicago, Ill.

Athey MobiLoaders Speed the Job-- Dig, Haul, Dump Big Loads Quickly

WILDERNESS landing fields are a vital part of America's victory march. From the green jungles of the tropics to the far north, scores of landing fields are being built. And the fast-working Athey MobiLoader has the ruggedness, the speed and mobility to set a lively pace on these tough construction jobs.

Here's a pair, grubbing out roots and root-matted soil, leveling for an airport in the woods where allied planes will soon be operating. Tractor mounted, the Athey MobiLoader is especially well suited for emergency wartime construction.

It works in a "direct line" movement; digs its load, travels

in reverse to the truck, or fill, and discharges the material overhead. No waste motions, no lost time. It reduces operating expense, speeds up every loading operation, saves valuable minutes.

The big-capacity Model 8 MobiLoader, mounted on the "Caterpillar" D8 Tractor, handles loads of big power shovels with its 4 cubic yard bucket. It works in a wide range of materials from iron ore to crushed rock, has a variety of bucket sizes to best suit the type of material being loaded.

In wartime, as in peace, the Athey MobiLoader is bringing new highs in production, new lows in costs, to help hasten the Victory for the United Nations.

THE JOB WILL BE DONE

IT'S FORTUNATE for industry that "Caterpillar" Diesel Tractors, Motor Graders, Engines and Electric Sets have always been built "better than they had to be." It's doubly fortunate that "Caterpillar" has built up the strongest dealer-service organization in the heavy-duty machinery business.

Because today these tough machines have got to shoulder a load beyond their expected years of service—even beyond their rated capacity—to carry their important share of the toughest construction and production job in history.

Your "Caterpillar" dealer has met this challenge willingly. He knows the sturdy quality that's in "Caterpillar" equipment, just as he knows the equipment itself—down to the last nut and bolt. He has firm confidence in the ability of the machines now in use, and in his own ability to keep 'em rolling, come hell or high water.

Take a look into his parts room. Right now

he has a bigger stock of genuine "Caterpillar" replacement parts than ever before.

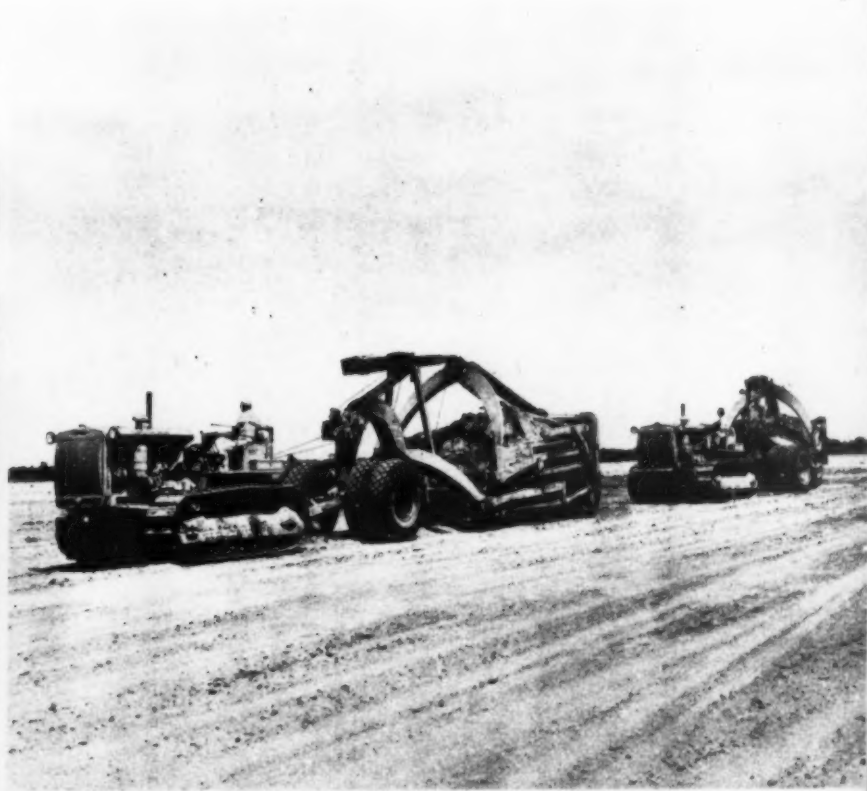
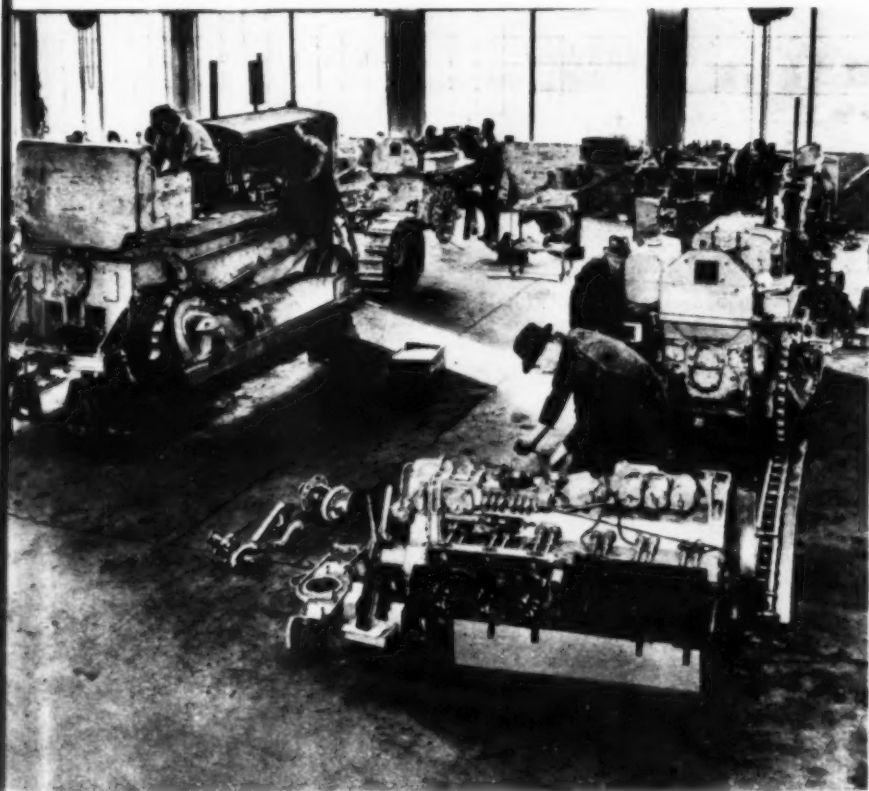
Then look at the service facilities he maintains—the specialized tools and the trained mechanics, ready to do a thorough job on your tractor or engine, night or day.

You're working all your machinery extra hard. Time is vitally important on the jobs you're doing. So don't put off servicing your "Caterpillar" equipment till you're stopped by a major breakdown. An inspection now by your "Caterpillar" dealer may save you a lot of hours—and dollars.

In these days when there's a war to win, it's a comfort to know good men are fighting on your side. Your "Caterpillar" dealer is right with you all the way. He's ready to help you look your "Caterpillar" equipment over—get it fixed if it needs repairs—keep it working where its rugged power and fuel economy will count—and make it last till the day of victory comes.

SEVEN WAYS TO LENGTHEN THE LIFE OF YOUR "CATERPILLAR" EQUIPMENT

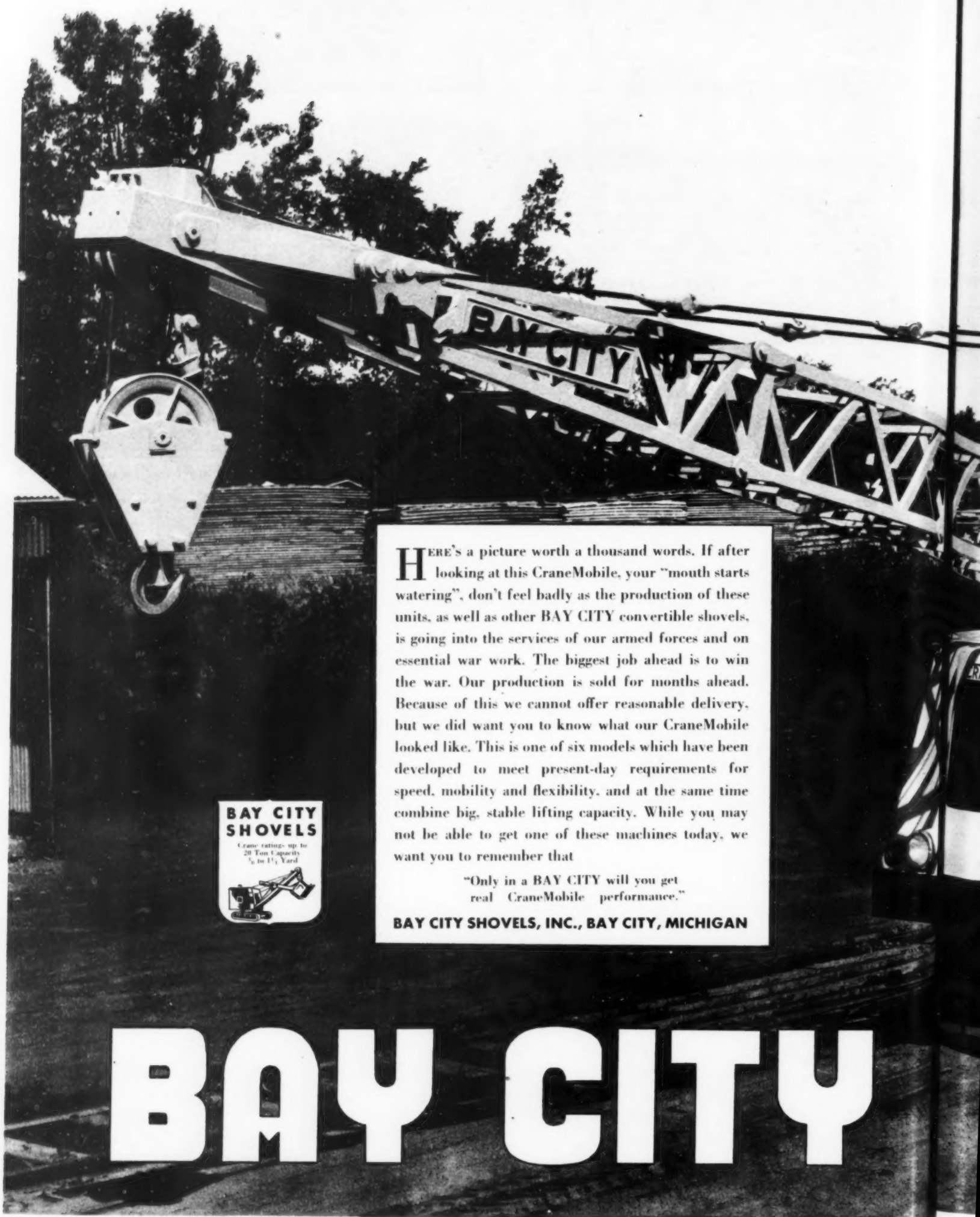
- Follow implicitly the *Operator's Instruction Book*.
- Have a complete inspection check made.
- Have track pins and bushings turned to increase track life.
- Have worn track rollers built up.
- Have valves ground and valve seats renewed.
- Have clutches relined.
- Have cylinder liners etched for added life.



CATERPILLAR DIESEL

CATERPILLAR TRACTOR CO. • PEORIA, ILLINOIS

TO WIN THE WAR: WORK—FIGHT—BUY U. S. WAR BONDS!



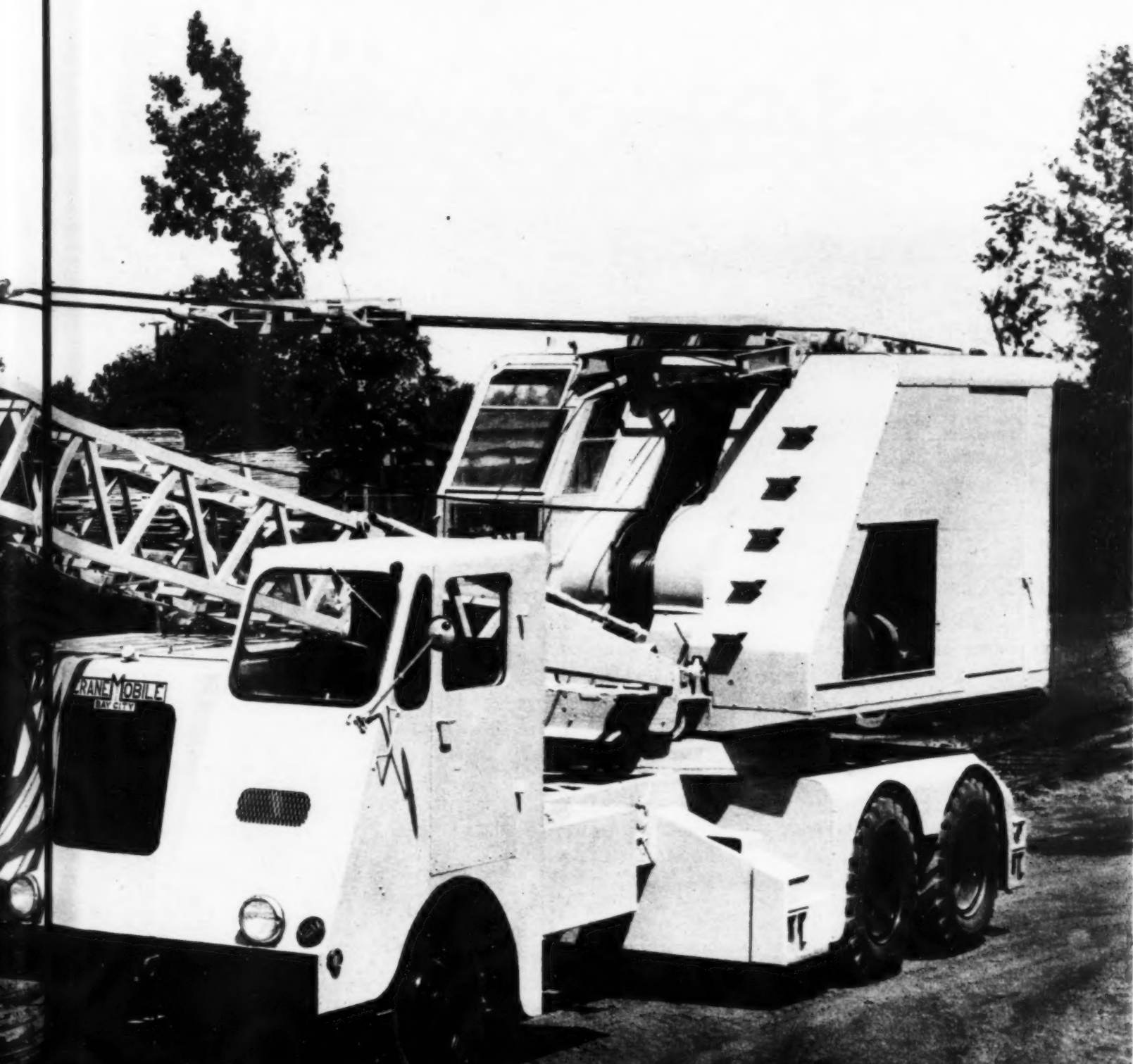
HERE's a picture worth a thousand words. If after looking at this CraneMobile, your "mouth starts watering", don't feel badly as the production of these units, as well as other BAY CITY convertible shovels, is going into the services of our armed forces and on essential war work. The biggest job ahead is to win the war. Our production is sold for months ahead. Because of this we cannot offer reasonable delivery, but we did want you to know what our CraneMobile looked like. This is one of six models which have been developed to meet present-day requirements for speed, mobility and flexibility, and at the same time combine big, stable lifting capacity. While you may not be able to get one of these machines today, we want you to remember that

"Only in a BAY CITY will you get
real CraneMobile performance."

BAY CITY SHOVELS, INC., BAY CITY, MICHIGAN



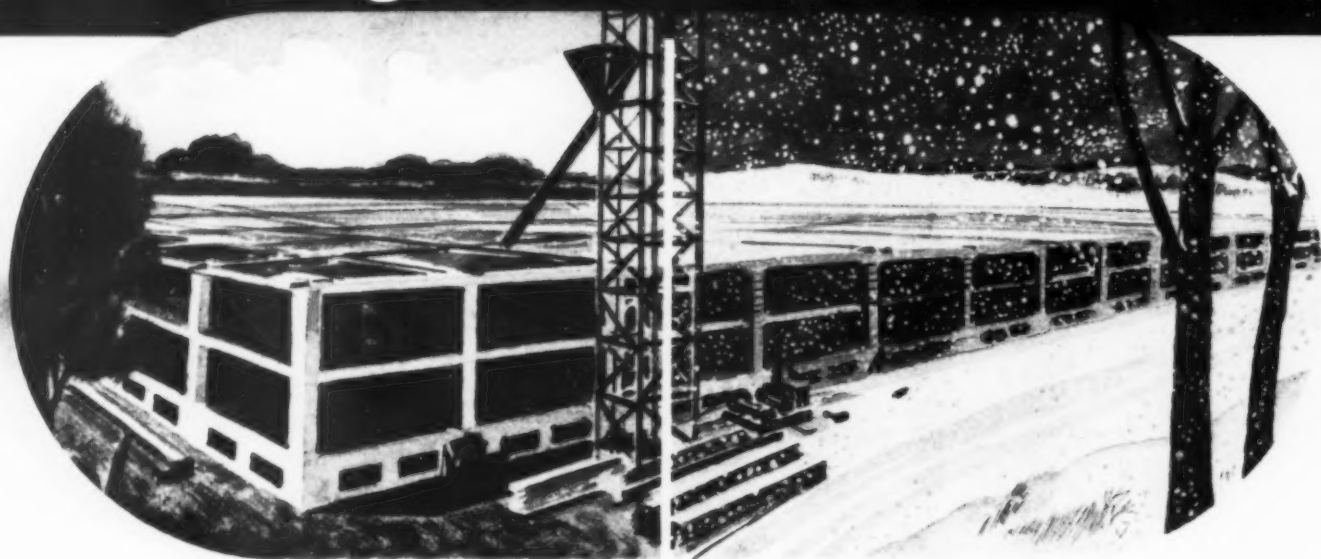
BAY CITY



CRANEMOBILE

*Reg. U. S. Pat. Off.

KEEP COLD WEATHER CONCRETING ON SUMMER SCHEDULES WITH . . . CALCIUM CHLORIDE



DO you know that when concrete, openly exposed to temperatures as low as 25° F., contains the proper amount of calcium chloride, it acquires strength as rapidly as plain concrete placed at 70° F.? The addition of calcium chloride compensates for this 45° drop in temperature.

The lower the thermometer goes, the greater is the need for calcium chloride. The more urgent the need to meet time schedules, the more urgent the need to use calcium chloride. The greatest gains from the use of calcium chloride are obtained at low temperatures and early ages when they are vital.

Since it shortens time of set 2/3 to 4/5 depending on temperature, and since it saves from 1/2 to 3/4 the time of waiting to remove forms and place succeeding courses, calcium chloride enables contractors to keep winter concreting on summer schedules.

CALCIUM CHLORIDE ASSOCIATION, 4145 Penobscot Bldg., Detroit, Mich.

New Free Book on Cold Weather Concreting



Write for this new highly informative 64-page Cold Weather Concreting Manual. It gives the facts as stated by competent research agencies such as The National Bureau of Standards and as proved in general practice. The book covers methods, materials and results.

CALCIUM CHLORIDE ASSOCIATION
4145 Penobscot Building, Detroit, Mich.
Please send new 1942 Manual "Early Strength Concrete."

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CALCIUM CHLORIDE

SPEEDS YEAR 'ROUND CONCRETE CONSTRUCTION



Black & Decker Tools Keep Big Scale Construction HUMMING ... YOUR Equipment ROLLING

during our Mighty
War Effort_____



No matter how big the job ... or how tough ... or how soon it must be finished, Black & Decker Tools can help you do it *faster, better, at less cost*. Whether it's sawing heavy lumber, boring wooden timbers or metal fastenings, cutting through concrete, or helping keep your own equipment in top-notch repair, there's a powerful, precision-built Black & Decker Tool to do the job. They are all "Universal" and operate from any electric socket or portable generator. And "Electric Tool Headquarters" builds 'em to *stand up* under the toughest jobs on any assignment.

Furthermore, 26 Black & Decker factory-owned service branches from coast to coast are ready to give you fast delivery on necessary repairs or parts. Get your jobber on the 'phone today—ask him for a demonstration of the B & D Tool or tools you need.

Do It Faster

SAVE PRECIOUS MAN-HOURS
...SEND FOR FREE HANDBOOKS

Dozens of construction applications of Black & Decker Portable Electric Tools are shown in these building handbooks. Free to contractors. Check the ones you want, mail to The Black & Decker Mfg. Co., 759 Penna. Ave., Towson, Md.



☐ GENERAL
TOOL CATALOG

☐ SAW
HANDBOOK

☐ HAMMER
HANDBOOK



FOR FABRICATING HEAVY TIMBER ROOF TRUSSES in army cantonment project, heavy duty Black & Decker Electric Drills are used to keep production ahead of schedule.

GET IN THE SCRAP WITH YOUR SCRAP

LEADING DISTRIBUTORS EVERYWHERE SELL

Black & Decker

PORTABLE ELECTRIC TOOLS



SAVING VALUABLE MAN-HOURS in today's rush of housing projects and war plant construction. These Black & Decker Electric Saws are kept safe always by instant-action, ball-bearing telescoping blade guards.



KEEP EQUIPMENT ROLLING the Black & Decker way. Here a positive clutch Nut Runner is used on tractor shoe bolts ... just one of many ways Black & Decker Tools can help keep your equipment in shape.

PRACTICAL METHODS OF LUBRICATING YOUR WIRE ROPE

... to help you get longer service ... to help you conserve steel

The benefit derived from systematic lubrication of wire rope is one of those apparently intangible things that are difficult for the average user to find among his many operating problems. However, laboratory and scientifically controlled field tests have proved that wire rope, like any machine part, lasts longer if it is kept well lubricated.

What are some simple ways to lubricate wire rope on your job?

Preparation

It is very desirable that the rope be clean and dry. A jet of air, steam, or wire brushing, followed by a period in which the rope is allowed to dry, are some of the methods used preparatory to applying the lubricant.

First, you can brush the lubricant on to the rope



FIG. 1

Illustrated, in Figure 1, is one easy and effective method of applying lubrication. Dip the brush into the lubricant and apply. In some cases a rag or piece of sheepskin is dipped in the lubricant and used to swab the lubricant on to the rope.

Applying by hand with leather gloves



FIG. 2

Another simple method is shown in Figure 2. Leather is preferred to

canvas, because of its greater protection and less penetration of the grease.

This method is especially good where a heavy, non-flowing lubricant is applied. It is often desirable to heat lubricant slightly to get a smoother, better application.

You can make a simple lubricating device

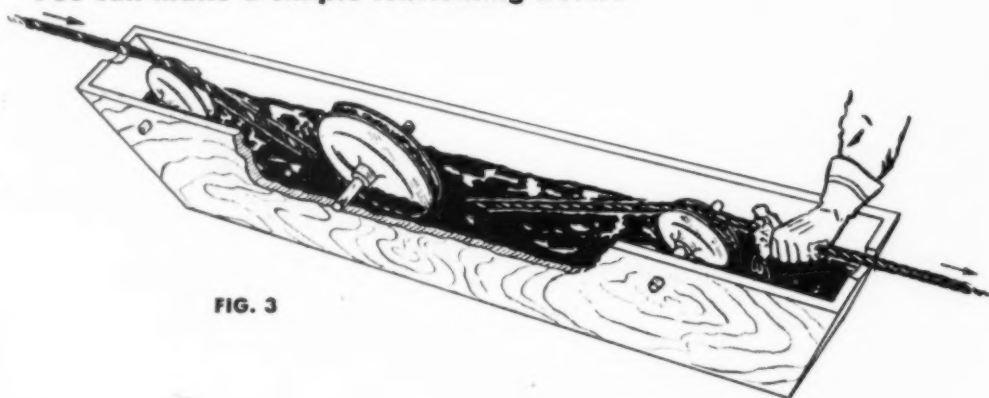


FIG. 3

A wooden trough with a sheave mounted on a shaft does a good job.

Such a trough, or slush box, is illustrated in Figure 3. The rope is run over the end of the trough, under the sheave, and out the other end so that the rope runs through the lubricant. A rag or swab held in place at the outgoing end wipes off excess lubricant. A slush box for vertical ropes is shown in figure 4.

Proper lubrication helps to seal in the Macwhyte internal lubrication that covers each wire during the manufacture of the rope. It helps to keep out water and dirt, and guards against corrosion.

Regular inspection of the rope with frequent applications of lubricant produces better results than heavy coatings less frequently applied.

The methods illustrated are those in most common use and cover most wire rope applications. Various methods used in service often depend upon the particular type of lubricant and whether it is applied hot or cold.

The use of wire rope varies so greatly that it is not possible to set forth here any particular types of lubricant to use. Macwhyte engineers are always glad to give you the benefit of their experience in special cases.

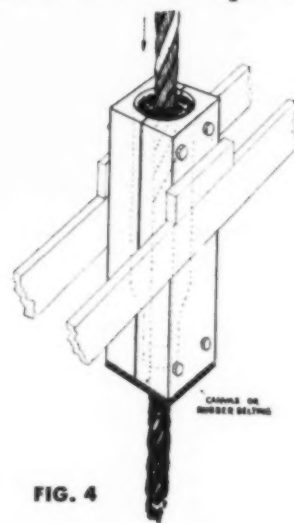


FIG. 4

This is number 12 in a series of informative articles prepared by the Macwhyte Wire Rope Company. All articles in this series are available on request.

MACWHYTE COMPANY

2940 Fourteenth Avenue • Kenosha, Wisconsin

Mill Depots:

New York • Pittsburgh • Chicago
Ft. Worth • Portland • Seattle • San Francisco
Distributors throughout the U. S. A.

Macwhyte Company Manufactures:

MACWHYTE PREformed and Internally Lubricated Wire Rope
MONARCH WHYTE STRAND Wire Rope
MACWHYTE Special Traction Elevator Cable
MACWHYTE Braided Wire Rope Slings
MACWHYTE Aircraft Cables and Tie Rods

NO. 641



Macwhyte's premier wire rope, famous for its strength, toughness, and internal lubrication.

Let a FIRESTONE Tire Specialist Analyze Your Equipment...



... and Help You PRODUCE MANY Extra Hours of Service

EXTRA service is as important as ammunition and it is up to every earth-moving contractor to help produce his share. Let a Firestone tire specialist analyze your equipment and show you how to get many thousands of extra hours from your earth-mover tires. He will:

- ★ Report on tire abuses that are causing premature wear.
- ★ Recommend treading and repairing where necessary.
- ★ Advise on which wheels treaded and repaired tires should be used.

★ Examine tires removed from service for additional evidence that may show how to make your tires last longer.

★ Will assist your tire service man in setting up a regular routine for earth-mover tire maintenance.

Your nearby Firestone Dealer or Firestone Store will gladly arrange for a complete analysis of the tires on your earth-moving equipment by a Firestone tire specialist. Call today.

FOLLOW THE TIRE SAVING SUGGESTIONS IN THIS FREE BOOKLET

Send for this free booklet today. It tells you the proper tire to use on each type of earth-moving machinery and how to avoid the effects of over and under inflation, careless operating practices, mechanical defects and neglect of cuts and bruises.

Listen to the Voice of Firestone with Richard Crooks, Margaret Speaks and the Firestone Symphony Orchestra, under direction of Alfred Wallenstein, Monday evenings, over N. B. C.

Copyright, 1942, The Firestone Tire & Rubber Co.



Firestone

AKRON, OHIO • MEMPHIS, TENN. • LOS ANGELES, CALIF.

GROUND GRIP TRUCK TIRE

This greatest of all traction tires is for use on driving wheels of earth-moving trucks, truck tractors and semi-trailer units in soft going or fill at moderate speeds.



ALL NON-SKID EARTH-MOVER TIRE

Designed for scrapers and trailer wagons. Low inflation pressures prevent impact breaks and provide maximum flotation in rough terrain and soft going.



ROCK GRIP EXCAVATOR TIRE

A wide chevron tread provides greater traction and a cut-resisting tread with double thick sidewalls provides greater strength for coal and ore strip mining operations.



MORE EARTH-MOVING MACHINERY IS EQUIPPED WITH FIRESTONE TIRES THAN WITH ANY OTHER MAKE



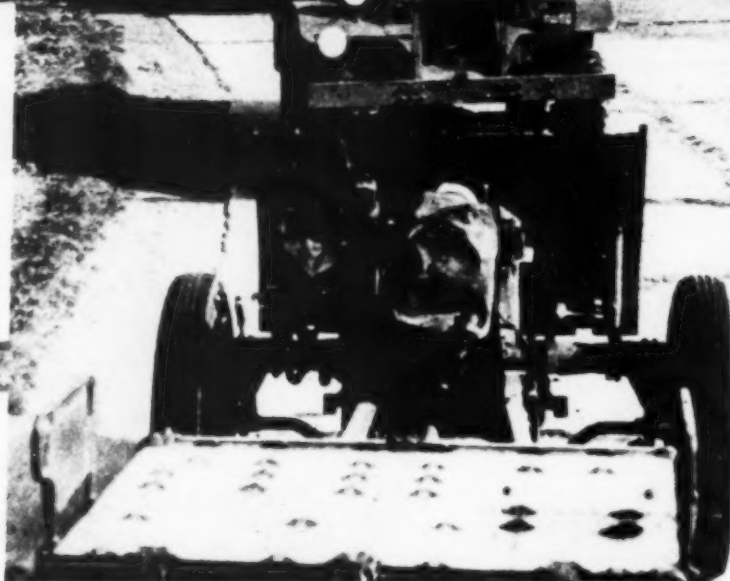
MAINTENANCE

is today's problem at the front and at home. For full maintenance of operating efficiency and avoidance of replacement shutdowns in the CONSTRUCTION field use . . .

... SINCLAIR SPECIALIZED OILS AND GREASES.

These lubricants protect against wear and keep equipment delivering top output in continuous service.

Write for "The Service Factor"—a free publication devoted to the solution of lubricating problems.



CEDAR RAPIDS Primary Crusher of Bero Engineering & Construction Corp., No. Tonawanda, N. Y. 1500 to 1800 tons crushed stone handled on 10 hr. basis daily. Sinclair Oils used.



SINCLAIR LUBRICANTS-FUELS

FOR FULL INFORMATION OR LUBRICATION COUNSEL WRITE NEAREST SINCLAIR OFFICE

SINCLAIR REFINING COMPANY (Inc.)

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10 WEST 51ST STREET
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RIALTO BLDG.
KANSAS CITY

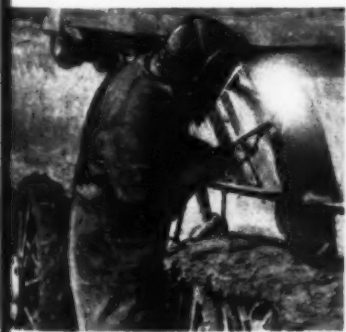
573 WEST PEACHTREE STREET
ATLANTA

FAIR BUILDING
FT. WORTH

NOW— without priority



Repairing the latch on a shovel dipper by welding.



The battered side of this "cat wagon" is put back in shape with P&H electrodes.



Worn out gears can be rebuilt to last longer than originally with P&H "Harcote" electrodes.

ALLOY ELECTRODES FOR MAINTENANCE AND REPAIR

Of course, war production comes first! But America's construction and mining equipment must be kept on the job. Arc welding is the answer. That's why the U. S. Government (through Limitations Order No. 146) makes it possible for you to secure, *without priority*, the welding electrodes necessary for maintenance and repair work.

Our fullest cooperation makes available a limited percentage of our production of P&H Alloy Electrodes for this purpose. These include such indispensable electrodes as P&H "Harcote" for hard-surfacing to resist wear and give new life to many parts. Other electrodes are available to answer every need for resisting wear, abra-

sion, and impact; for welding stainless steels, 4-6% chrome steel, etc. The only restriction is that they must be used for maintenance and repair.



How To Order

Write us; we will send you information on how to obtain P&H Alloy Electrodes, also data sheets on how to select and use them.

General Offices: 4494 West National Avenue, Milwaukee, Wisconsin



Awarded the Navy "E" for excellence in war production, P&H displays it also as a pledge of future effort.



Canadian Distribution: The Canadian Fairbanks-Morse Company, Ltd.

FOR ALL-OUT SPEED in Construction!

**PICTURE CENSORED
FOR THE DURATION**

FOUNDATIONS FOR 4½-TON LATHES READY IN 19 HOURS

• Foundations for 4½-ton lathes making 300- to 400-lb. bomb-casings were needed quickly. The contractor reported that placement of Atlas High-Early concrete was completed at 12:00 noon. At 7:00 the next morning, the lathes were in place on the foundations and working.

Typical examples of "Full-Speed-Ahead" building with Atlas High-Early cement. Now is the time to put this easily available material to work.

WHAT is your speed problem in construction? A war emergency building? An addition to a munitions plant? A military road? An airport runway? A naval base? A cantonment?

You will find an answer in Atlas High-Early cement for any type of construction work. Its rule is "Speed" — in building, converting, or repairing — in summer or winter. On typical jobs it has saved from one week to more than two months. And, while speeding up schedules, it often saves money on forms, curing, and protection.

Read what happened on the jobs illustrated here. On your next "Rush" contract, use Atlas High-Early and see what it will do for you. In actual application it is similar to normal portland cement and just as easy to handle. Universal Atlas Cement Company (United States Steel Corporation Subsidiary), Chrysler Building, New York City.

OFFICES: New York, Chicago, Philadelphia, Boston, Albany, Pittsburgh, Cleveland, Minneapolis, Duluth, Kansas City, St. Louis, Des Moines, Birmingham, Waco.

TIME FOR COMPLETION CUT IN HALF



• The construction superintendent reported that Atlas High-Early, in addition to cutting time for completion approximately 50%, permitted earlier stripping of forms, saving 50% in form lumber costs.

NEW FLOOR READY IN 24 HOURS



SAVED 33% CONCRETING TIME



• In this 300-ft. x 600-ft. building, the contractor stated that Atlas High-Early cement cut concreting time 33% and saved 68% in rental cost of metal-pan forms.

• When munitions work called for a new 80-ft. x 300-ft. building, the company got it fast with Atlas High-Early cement. Twenty-four hours after concrete was placed the floor was in use.

CM-H-48

ATLAS HIGH-EARLY CEMENT

A UNIVERSAL ATLAS PRODUCT



With Buckeye

CABLE control

your tractors can do
more jobs!

Buckeye Power Control Units fit all makes and models of tractors. Unit illustrated is standard width double drum medium heavy duty model. Note two decks for fairlead swivel sheaves — upper for dozer control, lower for equipment towed by tractor drawbar. A feature that means perfect balance, greater efficiency.

become the handy men of the outfit with one, or two, lines instantly available for 101 other jobs.

The big, wide drum, Heavy Duty Hoists spool 350 ft. of $\frac{1}{2}$ " cable, give you over 8000 lbs. line pull and a line speed of over 300 ft. per minute.

Buckeye Power Control Units are fast—a touch of the control and the line sings into action. They conserve cable, take hold of the load smoothly and evenly with no jerks, and the sheaves are designed to minimize cable wear—you can use smaller, less expensive cable than with other winches having comparable line pulls. Big clutch and braking area plus external location means cool operation and long life. Center of line pull is low to maintain tractor balance and better traction. Controls are high leverage, within easy reach. You have your choice of Heavy or Medium Heavy Duty, single or double, wide or standard drum, models.

To speed up War jobs, unshackle your tractors with Buckeye Power Control Units. Write today and ask for specification data and prices on the models to fit your tractors.

BUCKEYE TRACTION DITCHER CO.
Findlay • Ohio

Built by Buckeye



On the Record... the **MILEAGE-MOST TIRES** You can buy!

IN MIXED DIRT-AND-ROCK
FILLS super-sturdy Goodyear Hard Rock Lug
Tires afford greater traction — better protection
against cutting and gouging.

COUNT US IN, UNCLE SAM!

Goodyear is earnestly playing its part in the U. S. Truck Conservation Corps Program. Its dealers and service stores have been conducting a determined drive to obtain conservation pledges from truck owners, drivers and mechanics. And the Goodyear Truck Tire Engineering Service, in educating the public to the necessity of tire care, is helping to assure the widespread success of this vitally important work.

**Pledged
U.S. TRUCK
CONSERVATION CORPS**

NEVER before has it been so urgent to get the longest-wearing tires obtainable—because rubber is becoming scarcer every day.

On the record—the records of leading contractors everywhere—Goodyear tires stand first in mileage. That is why haulers have bought more Goodyear Truck Tires than any other kind for over twenty consecutive years.

You can't ignore evidence like that. It's proof that Goodyears give longer wear under any road conditions, both before and after recapping; that they cost *least* per ton-mile.

There are good reasons for this. Goodyear's specially designed treads for greater traction in either

sand, mud or rock. Goodyear's multiple-compound construction that reenforces the carcass and prevents tread-separation. Goodyear's wide tread that insures maximum flotation. Goodyear's heavier, dual, beads.

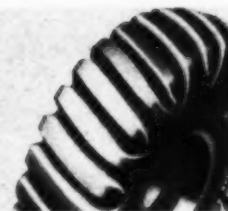
Add it all up and you get the *mileage-most* tires you can get for your certificates—yet Goodyears cost no more.



MORE TONS ARE HAULED ON GOODYEAR TRUCK TIRES THAN ON ANY OTHER KIND

**Goodyear
HARD ROCK
LUG**

for all rock work



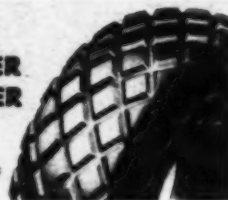
**Goodyear
SURE-GRIP
GRADER**

for mud and marsh



**Goodyear
ALL-WEATHER
EARTH MOVER**

*for
drawn dirt-movers*



All-Weather—T.M. The Goodyear Tire & Rubber Company

Construction Methods

ROBERT K. TOMLIN, Editor

Volume 24

OCTOBER, 1942

Number 10

Small Tools AT SHASTA DAM

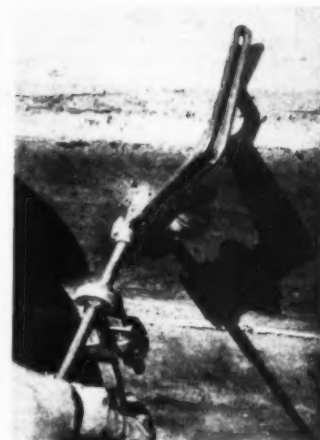
SMALL TOOLS today find a variety of applications on big jobs. Herewith are illustrations by Tex Gibson, official photographer, showing only a few of the scores of small tool uses by Pacific Constructors, Inc., at Shasta Dam, U. S. Bureau of Reclamation project in California being completed under direction of Ralph Lowry, construction engineer.



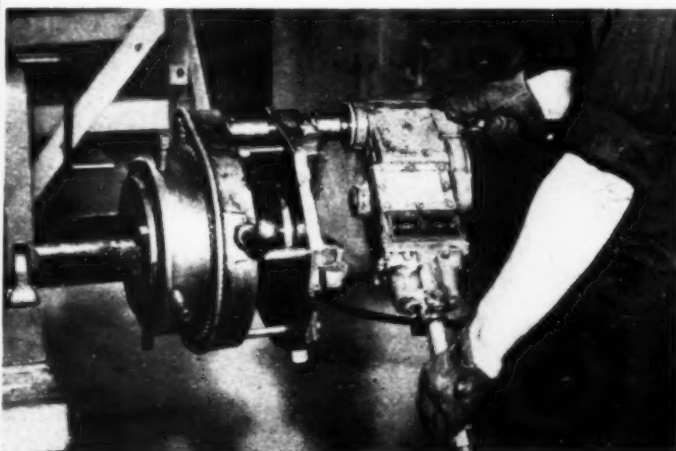
INSULATION IS STRIPPED (left) from stranded copper cable by 6-in. Crestaloy diagonal cutting pliers.



HOLES IN CONCRETE (left) at powerhouse are drilled to 1½-in. diameter with Thor pneumatic tool.



USED AS PIGTAIL WRENCH (right) with 14-in. Stillson is this 18-in. Walco wrench with handle bent at right angle in shops of Pacific Constructors, Inc., to service concrete forms.



CLOSE-QUARTERS DRILL of Chicago Pneumatic make is used on Toledo 6-in. pipe die at Shasta power plant.

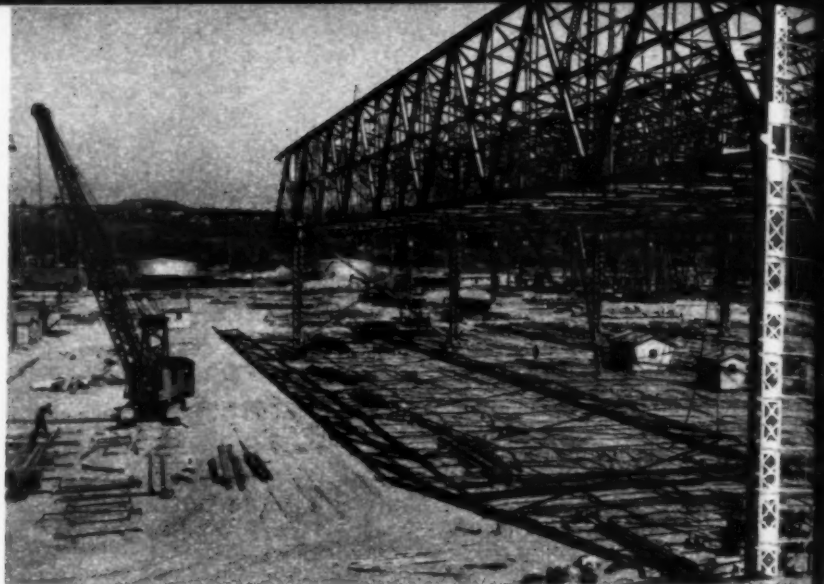
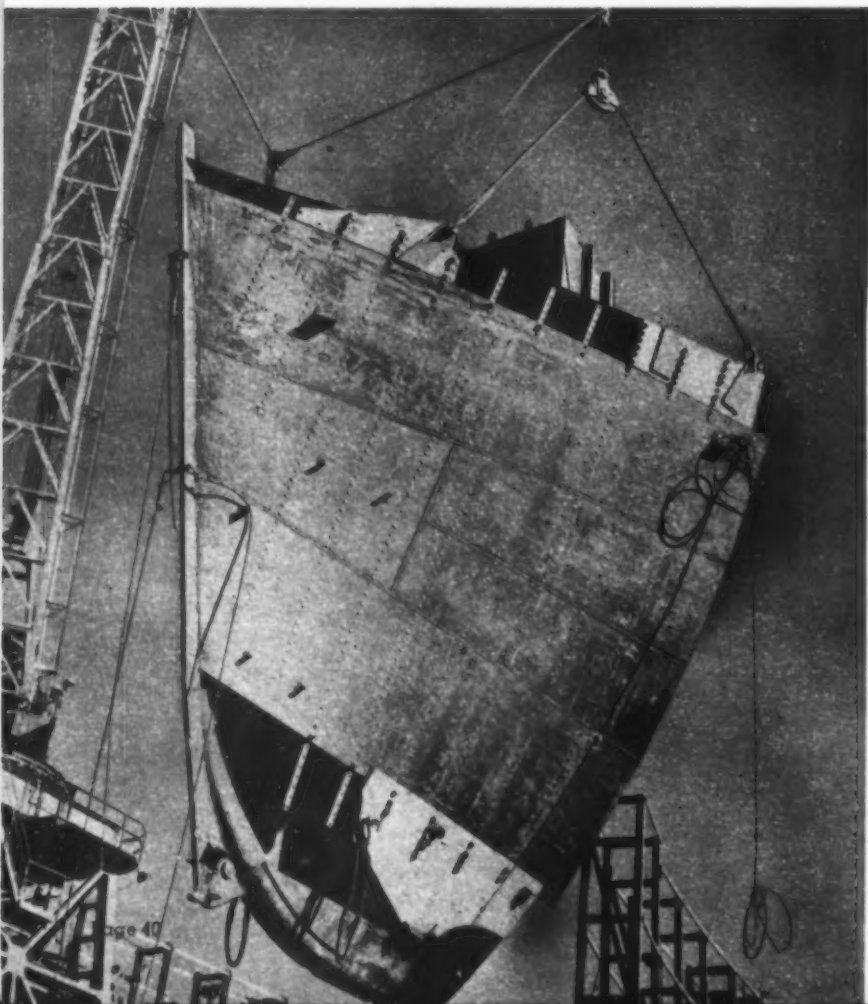


SCROLL-CASE INSTALLATION involves use of Williams super-wrench and cross-beam sledge operating on nuts for 2¾-in. bolts.



CONSTRUCTION SCHEDULE EXPEDITED on Fort Loudoun Dam by round-the-clock operation. Work on this Tennessee Valley Authority project is under forced draft as power from its two 32,000-kw. generators is needed for our war effort. Photo shows forms for elbow-type draft tubes being made ready for concreting. Dam has length of 4,835 ft. and its crest rises 135 ft. above river bed. It will form final pool in chain of TVA lakes, reservoir reaching almost to Knoxville, 55 river-miles away.

FORE PEAK (below) of Henry J. Kaiser ship being transferred from area where it was assembled to its position on ways in a West Coast shipyard. Recently but ten days elapsed from time keel plate of one of these ships was laid down, and launching of vessel.



UNOBSTRUCTED FLOOR AREA obtained by 300-ft. span in new West Coast Boeing aircraft plant. These roof trusses are being placed in position with A-frame, and crawler crane having 95-ft. boom. Austin Co., engineers and contractors of Cleveland, Ohio, designed and erected these trusses, which have depth of 35 ft. and are spaced 65 ft. on centers.

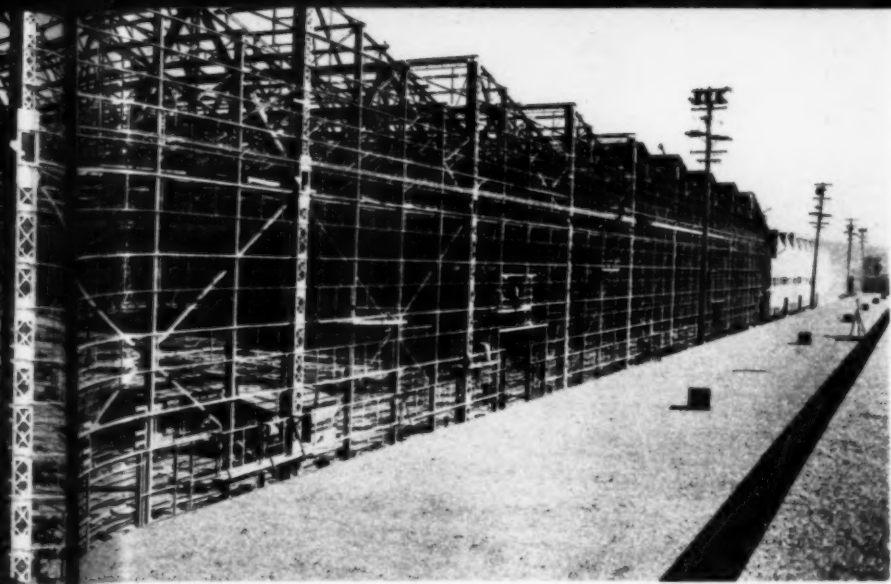
THIS MONTH'S NEWS REEL

Wide World Photo

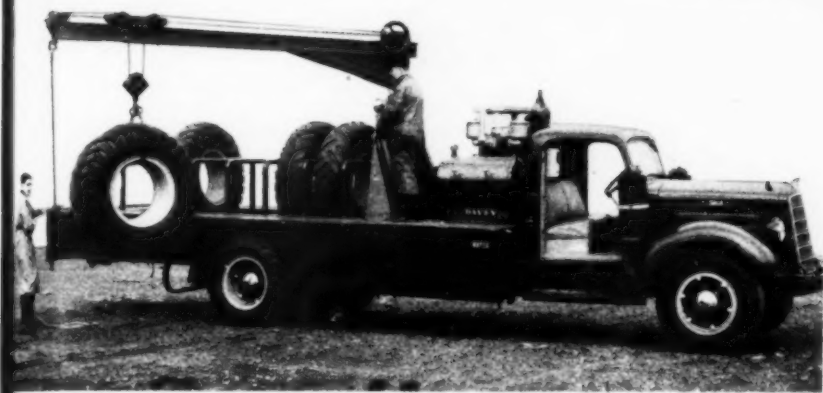


HOME WAS NEVER LIKE THIS! One of experimental huts built of plywood by Pacific Huts, Inc., for men of an anti-aircraft battery near Seattle, Wash. Igloo huts, name they are known by, can be quickly erected and are much simpler to camouflage than dwelling with sheer walls.





Austin Company Photo.



TWENTY TIMES as heavy as average auto tire. Specially equipped Mack truck is used to carry tire shoes weighing 600 lb. each to service Mack dumpers working on Panama Canal Third Locks project.



LAST OF NEW YORK CITY'S EL STEEL goes for war work. Second Ave. elevated structure is being demolished by Albert A. Volk Co., under supervision of Charles Fleschner, secretary and general superintendent, for Department of Borough Works, Borough of Manhattan, Walter D. Binger, Commissioner. By altering original specifications which called for sale of steel to mills where it would be used as furnace scrap, to one permitting sale of salvaged shapes, borough obtained higher price per ton. This resulted in payment by contractor of \$133,000 for right to tear down structure, which contained approximately 25,000 tons in length from Chatham Square to Queensborough Bridge. Rails in satisfactory condition, both track and third, are to be re-used on war projects. Some structural sections will be split, re-heated and re-rolled as strap, rod or reinforcing bars.

Underwood & Underwood Photo



ROUNDOUT-WEST BRANCH TUNNEL, last link of 85-mi. Delaware aqueduct bringing much needed water to New York City, holed through from Shaft 1 by Mason and Hanger Co., Inc. May 7,

1942, witnessed firing of shot connecting Shafts 1 and 2 near Ellenville, N. Y. Tunnel from Shaft 2 was driven by Samuel R. Rosoff, Ltd.

PONTON BRIDGE (below) carries equipment and supplies for new highway connecting continental United States and Alaska. All surveying and planning are being done by Public Roads Administration, T. H. MacDonald, Commissioner. This ponton bridge was laid down by men of U. S. Army Engineer Corps under direction of Col. J. A. O'Connor, and will be replaced by temporary timber bridge that will last until final surfacing of this strategic route.

Press Association Photo

CONSTRUCTION SPEEDED ON DOUGLAS DAM (below) by 5,000 men working in three shifts. War power project of Tennessee Valley Authority approaches its completion date, when it will catch spring rains of 1943. Construction of this dam has schedule calling for completion in 13 months.



EQUIPMENT DISTRIBUTORS RENDER TIMELY SERVICE IN

Repairing and Rebuilding

CONSTRUCTION MACHINERY NOW DIFFICULT TO REPLACE

Equipment Service For Contractors And Armed Forces Covers Wide Range

By E. G. WALKER

Manager, Construction Equipment Division,
Smith Booth Usher Co.,
Los Angeles, Calif.

BECAUSE ALMOST ALL NEW CONSTRUCTION EQUIPMENT production will be preempted by the armed forces, it is obvious that future business for construction equipment dealers will consist mainly of trading, reconditioning and reselling or renting used equipment of all makes. Present working equipment owned by contractors will, in most cases, have to last for the duration. Having this equipment in first-class operating condition, therefore, may mean the difference between staying in or going out of business.

The armed forces in various localities also need help, outside of their own organizations, in keeping their equipment in repair. Every cent spent now to recondition this equipment will increase its present and future value. Such maintenance and repair work becomes an economic necessity in prosecuting the war effort. Every construction equipment dealer in the country today must, if he has not already done so, re-vamp his organization and set-up to take care of this kind of business if he is going to stay in business and justify his existence as a machinery dealer.

There is nothing particularly new about all this to Smith Booth Usher Co., machinery dealers, of Los Angeles, Calif. and Phoenix, Ariz. While principally dealers in new equipment and machinery for many of the leading manufacturers in this country, we have done more or less rebuilding and servicing for the fifty years that we have been serving the trade in the Southwest. For the last fifteen years in our Construction Equipment Division we have maintained a

large number of units of various types of construction equipment for every service in our rental and rebuilt department which, together with a large repair parts business, has augmented the sale of new machinery.

Service Essential

To buy, recondition, rent and re-sell used machinery of all makes successfully, dealers must be well informed on the specifications and performance of all makes, sizes and models, must have an approximate idea of the list prices, former or current, in order to arrive at correct values for trade, rental or resale. They must have a fully organized and fully equipped service department, capable of rebuilding used machinery and restoring it to A-1 operating efficiency.

Buying right means half the sale and means the difference between a profit or a loss. So, in the Smith Booth Usher organization, all service and repair work has been placed in charge of a man with years of experience in repairing and rebuilding all kinds of construction equipment. He is responsible for appraising the used machine to be traded in or purchased and estimating the cost of re-building it. Under his supervision the mechanics must do a correct job of re-building and keeping the cost approximately within the original estimate. This man in charge of re-building operations is not in the selling end of the business and confers with the management or the sales department for information regarding selling values. He administers a force of a dozen mechanics, some of whom are experts in rebuilding, servicing and operating tractors; others specialize on power shovels; others on concrete mixers and pavers, and others on air compressors and tools. Some of these men are all-around mechanics who can work on nearly any machine. Some are helpers who are learning the business. Many are expert operators and are used to service, make deliveries and instruct on new equipment when delivered to the customer. Others are capable of going to the customer's location and repairing or servicing a machine on the job. Twenty-four hour service is available in emergencies. There is still another group of men, skilled machinists and their helpers, who look after the necessary machine work and the making of parts, if new parts are not available.

All of these men are paid on an hourly basis and those doing outside work furnish their own cars and hand tools and are paid mileage on their cars. Because distances are great and the jobs usually are at isolated spots, it is seldom economical or convenient to take a bus or train, but where it is possible they do so. To do work of this kind satisfactorily and economically requires, in addition to good workmen, plenty of room, a fully equipped shop with good tools, an ample supply of materials and repair parts with which to do the rebuilding.

Repair Parts Stocked

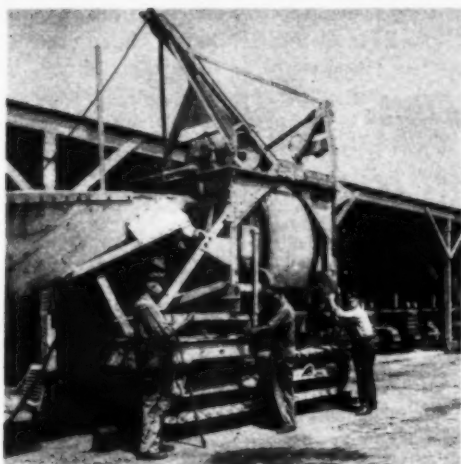
With the exception of one warehouse a block away, the Los Angeles plant of Smith Booth Usher is grouped on property

• During the present war emergency, no construction man needs to be reminded of the fact that it is difficult, and frequently impossible, to obtain new construction equipment to replace the machines he is now using and which are gradually wearing out under exceptionally severe operating conditions. It becomes necessary, therefore, if a contractor is to remain in business, to conserve the useful life of present equipment by careful maintenance and repair.

The current shortage of new heavy-duty equipment available for purchase affects not only the contractor, the state highway department, county and city engineering organizations and the public utilities, but also the equipment distributor who, in normal times, functions as the local selling agent of the manufacturer. Now, with little or no new equipment

to sell, the distributor is expanding the range of his maintenance, repair and rebuilding service facilities. All of the leading distributors maintain shop facilities which are now being operated to handle the vital repair and maintenance operations which construction men need to keep their equipment running.

To indicate the character and scope of their service facilities for maintaining construction equipment in satisfactory operating condition, **CONSTRUCTION METHODS** requested from seven representative equipment distributors, in different geographical areas, brief statements describing their repair and rebuilding operations and their shop equipment and methods for handling this important type of service. Their replies, with photographs of shop details, appear herewith. — EDITOR.



MECHANICS TEAR DOWN 27E MultiFoote paving mixer preliminary to making repairs at Smith Booth Usher yard.

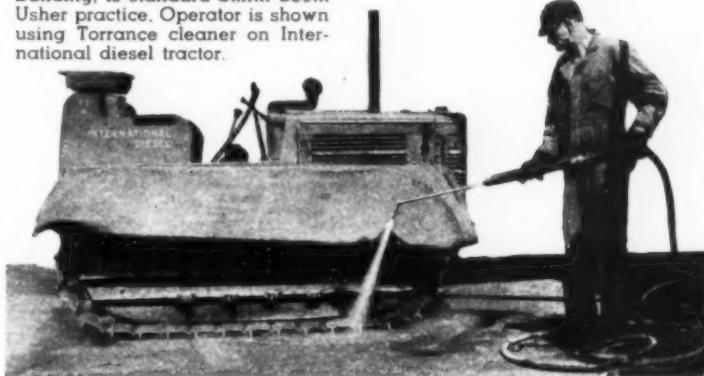


MAIN BUILDING of Smith Booth Usher Co. in Los Angeles, Calif., houses display rooms, sales and general offices.

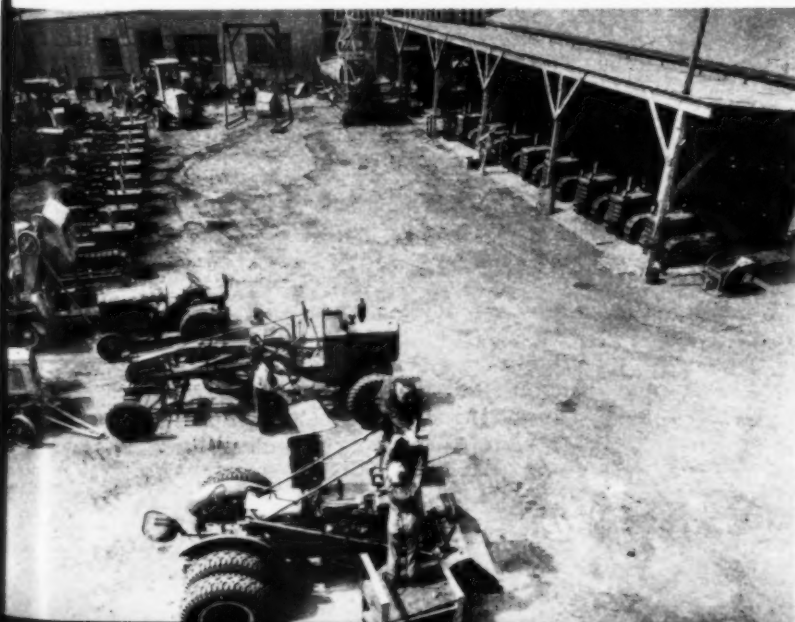
covering approximately 90,000 sq. ft. all on the ground floor and facing on three streets which provide considerable room for parking cars. The offices and display rooms of the various divisions are all in the front building. There is some warehouse space in the rear building, but this building also houses the shipping department, the machine shop and the repair parts department. An overhead crane runs the length of this building through the machine shop and shipping department.

The repair parts department is in one corner of the rear building fenced off from everything else and under lock and key and in charge of the parts manager and two assistants. This department is conveniently located for the trade, as trucks or cars can drive right up to the door. Because we are located some two or three thousand miles from the source of

STEAM-CLEANING OF EQUIPMENT, both before and after rebuilding, is standard Smith Booth Usher practice. Operator is shown using Torrance cleaner on International diesel tractor.



AT CONSTRUCTION EQUIPMENT YARD (below) of Smith Booth Usher Co., many types of construction machinery are repaired or rebuilt. In foreground, Hough loader is being installed on International wheel tractor.



MACHINE SHOP (below) of Smith Booth Usher, of which one corner is shown herewith is tooled to handle every type of repair or rebuilding operation.



supply, it is necessary for us in order to give quick service, to stock large inventories of repair parts; in normal times it is not unusual to carry as much as \$150,000 in repair parts alone. A perpetual inventory on cards kept up daily enables us to tell the customer on an instant's notice if parts are in stock. Replacement orders are sent in to the manufacturers daily.

Machine Shop Equipment

The machine shop housed in the rear building is equipped with: Lathes, drill press, floor presses, hand-screw and hydraulic presses, grinders and buffers, power hack-saw, pipe threading and cutting machine, electric bench drill, brake-lining machine, power saw, air compressor, shaper and various hand tools. Having our own machine shop enables us to give quicker and more economical service because we are not dependent on outside shops for deliveries and do not have to pay a profit for the work to someone else.

A large paved yard gives ample room for the larger equipment to be torn down and rebuilt. Part of the yard is roofed over so that during rainy or hot weather work can continue without interruption. Under the roofed-in part of the yard is installed a grinder and buffer, a hydraulic press, a bench drill and a pipe and bolt machine so that some of this work can be done right in the yard without having to send it to the machine shop.

In one corner of the yard is a steam-cleaning and paint shed with canvas sides to prevent the paint from blowing on or spreading to other equipment and cars parked on the side street. All equipment is thoroughly cleaned before tearing down, and after it is rebuilt is cleaned again and repainted. This practice adds life to the equipment and a good paint job will more than pay for itself when it comes to making a sale.

Fully 90 percent of the used equipment sold by this firm is torn down completely and rebuilt. We back up our work with an unusually broad guarantee, which reads as follows: "Our Guaranteed Serviced Equipment is sold with a positive guarantee of satisfaction. If, after equipment is delivered, purchaser finds it is not satisfactory because not suitable for character of work which he is doing, or for any other reason, it may be returned to us, freight charges prepaid and money will be refunded. No questions asked and no excuses are necessary."

The Rental Department operates in conjunction with the

Used Equipment Department. If sufficient used equipment is not available, our company will put new equipment in rental service.

Special shop and office record forms are used for each item of equipment. The shop forms show in detail just what work has been done, the material and parts used and the amount of labor. The office record forms show the initial cost of the equipment, the cost of repairs and the selling price, together with a complete description, the serial number and the item or used equipment number. If the equipment is rented, these same forms show unit of equipment, names of the people to whom it has been rented, time rented on each job, amount of rent charged, amount of depreciation from cost on account of rentals received and cost of servicing the equipment during the time it has been in rental service. This gives a complete history of the equipment at a glance. Every piece of equipment is thoroughly checked after each rental job, and the necessary repairs and cleaning and painting made before sending the machine out on another job.

By keeping accurate records we know what rental rates must be charged to bring in a fair profit. Likewise, these records are a guide in estimating the cost of rebuilding and are of considerable help to the appraiser in putting a fair valuation on the trade-in or the used equipment that is to be purchased. By such methods this firm, over a period of years, has built up a large rental and used equipment trade.

Sales Engineers

We use no special men to sell rental and used equipment, as it is handled by our regular men who sell new equipment. These men are so well versed in this business that they are also of considerable help in locating used equipment for sale and assist in making appraisals from time to time. They are sales engineers, rather than salesmen, and today more than ever before they are of great value, not only to the contractor, but to all the government agencies, in advising with reference to care and use of equipment, when and how to make necessary repairs to extend the useful life of machines, and how to select what is best for a particular job.

The Construction Equipment Division of Smith Booth Usher Co. has its own department manager, sales organization, shop and service and repair parts department and operates separately, but in conjunction with, the other divisions of the business.

Three Shops Equipped To Service Construction Machinery

By P. RIDINGS

Vice-President, Syracuse Supply Co., Syracuse, N. Y.

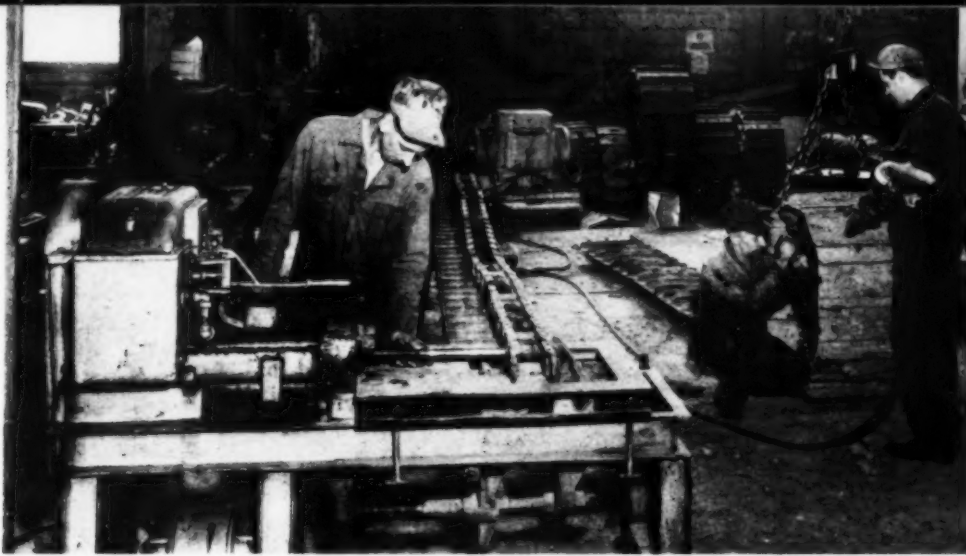
WITH THE INCREASING DIFFICULTY of getting new construction equipment, it is imperative that existing equipment already in the field be maintained in good operating condition. This equipment is being subjected to unusual abuse and the maintenance problem has multiplied many fold, due to the long hours it is being run and to inexperienced operators.

We have tried to meet this growing problem with modern shop equipment and trained service men. Many pieces of equipment have been invaluable in conserving critical material and manpower. Each of our service shops at Syracuse, Rochester and Buffalo has been equipped with steam cleaners, hydraulic track-pin presses, pneumatic wrenches, electric welders and at each point we have a complete parts' stock

with trained personnel in both the parts and service departments.

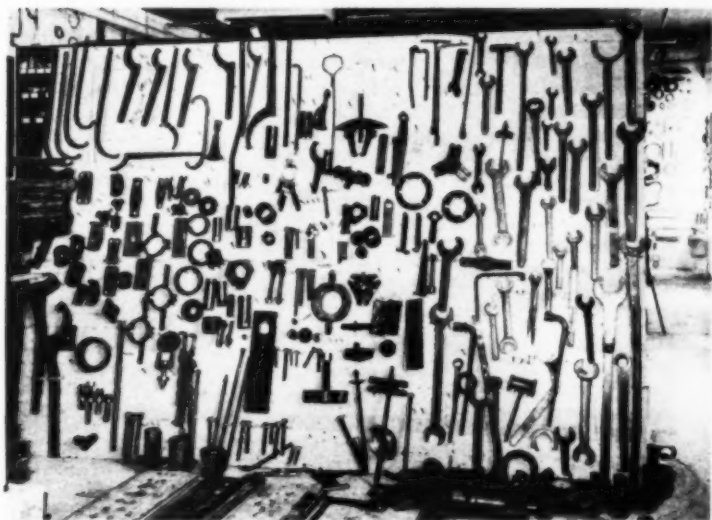
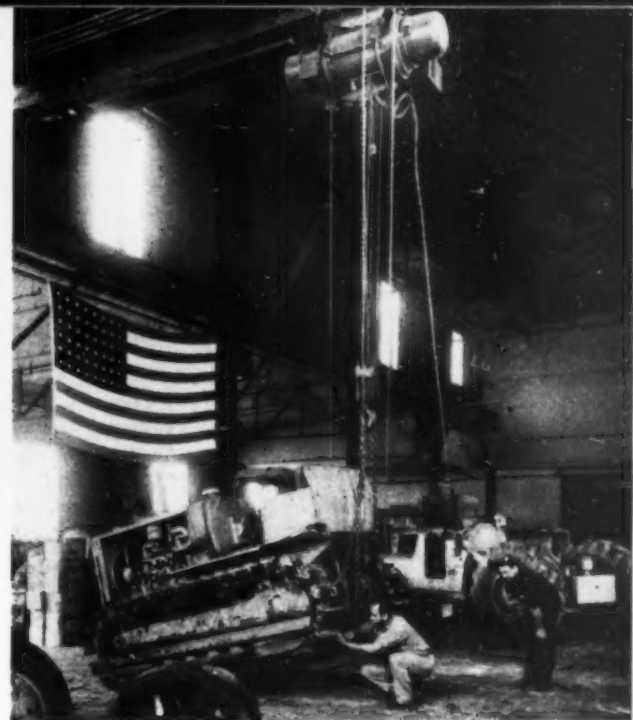
In our shop at Syracuse, which is approximately 100x150 ft., we have installed an 8-ton overhead electric crane operating on a trolley across the 40-ft. center bay running the entire length of the shop. We also have a 1½-ton electric crane running in the same bay for the lighter lifts. Here we have also installed a fuel-injection testing laboratory where we can, in a dust-proof room, test Diesel fuel-injection pumps and repair fuel-injection valves. Formerly it was necessary to use new valves and the old valves were wasted.

We have found that a thorough job can be done more quickly if the machine or part to be repaired is cleaned before



HYDRAULIC TRACK-PIN PRESS in Syracuse, shop repins and rebushes set of tractor track rails. At right reversible impact wrench salvages track bolts.

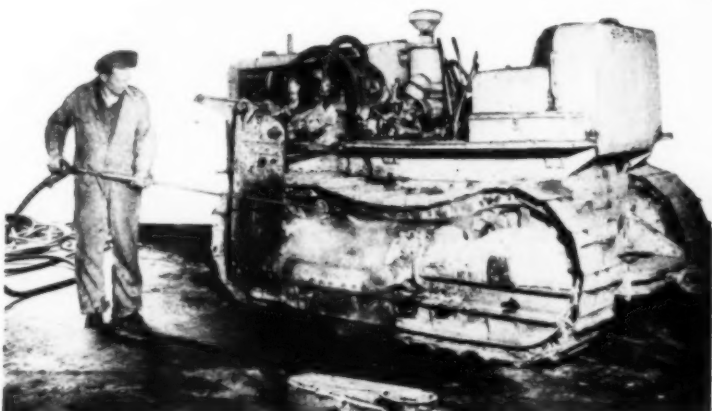
EIGHT-TON OVERHEAD ELECTRIC CRANE (right) operates across 40-ft. center bay of 100x150-ft. shop of Syracuse Supply Co. Service Manager "Monty" Wallace checks rollers, track pins and bushings of 8-ton Caterpillar tractor.



SPECIAL TOOL BOARD offers mechanics of Syracuse Supply Co. wide range of equipment for conserving time and labor on tractor and motor grader repairs.



SPECIAL EQUIPMENT in fuel injection laboratory of Syracuse Supply Co. is operated by Shop Superintendent "Chet" Williams.



BEFORE MAJOR OVERHAUL Kerrick steam cleaner is used on tractor in Syracuse shop.



ELECTRIC WELDER at Syracuse shop salvages sprocket that might otherwise be wasted.

LARGE STOCK OF SPARE PARTS (right) is maintained by Syracuse organization as important part of its equipment servicing facilities.



work is started, and for this operation we use a steam cleaner using a cleaning compound which can be varied in strength to do either a light cleaning job or cut grease or paint off the equipment.

Reversible pneumatic wrenches make it possible to save and reuse a large percentage of expensive heat-treated bolts and nuts where it was formerly necessary to destroy them by cutting the nut or bolt with cold cut or acetylene torch.

The track-pin press has made it possible to double or triple the life of a track-laying tractor set of tracks by either turning or replacing the pins and bushings in the track rail.

Each of our service departments is equipped with panel-body service trucks and in one of these trucks at each shop is installed a 250-amp. electric welder suitable for field welding.

A service manager is in charge of all shops and services in our complete territory, and is available for consultation by contractors' master mechanics as well as our own personnel. The shop superintendents are responsible to him and he makes appraisal of equipment to be completely rebuilt.

In the present emergency, where conservation of critical materials is vital, our service men are trained to urge repair of such parts as track rollers, pistons, tracks, etc., rather than replacements of these parts with new ones. They constantly instruct owners and operators in the proper care of equipment in an effort to reduce maintenance to a minimum.

When a new machine is delivered, a trained service man instructs the owner and operator in the proper lubrication and adjustment of the equipment, leaving with them a service manual with operating instructions and parts' books. A second service or checkup call is made at a later date. On this call the service man checks to see that proper adjustment has been made and answers any questions which the operator or owner may have relative to operation, lubrication or adjustment.

At a time when materials are scarce, when parts are hard to get and when skilled labor is difficult to obtain, too much cannot be said for good, practical labor-saving shop machinery, such as electric cranes, hydraulic presses, valve grinders, etc. It is practically impossible for anyone to get new machinery except for war projects or essential civilian operations. The old machinery must be kept running so that the home front can be maintained, but the war effort must be given preference. The savings effected in time and materials by modern tools and machines are invaluable and this, coupled with trained personnel who know how to use them efficiently, will "Keep 'em rolling"

To survive this emergency, until the final peace is gained through victory, nearly perfect coordination and understanding among owner, operator and trained construction equipment service man will be necessary.

New Building Provides Modern Shop Facilities

By JAMES L. NELLIS

Manager, Machinery Department,
Choctaw Culvert & Machinery Co.,
Memphis, Tenn.

WE HAVE JUST MOVED into our newly constructed shop for the repair and rebuilding of construction equipment. The building proper, as illustrated herewith, is 200 ft. long by 80 ft. wide. It is constructed of reinforced concrete, with walls made of lightweight aggregate concrete blocks. The center bay is 40 ft. in width and each of the side bays is 20 ft. in width. The building is well lighted by a large expanse of windows. It is also well ventilated, which is highly essential in this section of the country where it gets extremely warm in summer. The building has two large wash and locker rooms, one for negroes and one for whites.

The back door, through which a 10-ton, three-motor electric traveling crane operates, is 40 ft. wide and 23 ft. high, large enough to permit the entrance into the building of a crawler type shovel, crane or dragline without lowering the gantry. We do not believe that there is any crawler type machine built that cannot be walked into this shop under its own power without dismantling.

Some of the features that we have incorporated into this shop are:

(1) Complete machine shop with lathes, universal milling



NEWLY CONSTRUCTED SHOP of Choctaw Culvert & Machinery Co. is housed in modern, well-lighted building 200 ft. long and 80 ft. wide, with 40-ft. center bay served by 10-ton floor-controlled traveling crane. Back door is 40 ft. wide and 23 ft. high, large enough to allow any crawler machine to be walked into shop.



TRACTOR AND CONCRETE PAVER are being dismantled for rebuilding in brand new Choctaw shop.



ENGINE REBUILDING ROOM in shop of Choctaw Company is inclosed by walls of brick and glass, insuring clean, dustless atmosphere.

machine, shaper, radial drill press, straight drill press, grinders and all other small tools required in a shop of this kind. (2) Totally inclosed with brick and glass windows is our engine rebuilding room where work can be performed in a clean and practically dustless atmosphere. In this room, of course, are the various tools that are used in rebuilding gasoline and diesel engines.

(3) A totally inclosed room on one corner of the building where we have a modern vapor sand-blast. Some classes of equipment can be cleaned better with sand blast than by steam cleaning. For instance, there is no other method known that will economically clean concrete from an old mixer. All of our steam-cleaning is done outside the building on a concrete apron which runs the entire length of the structure. Three manholes are spaced at intervals along this runway. When a machine, such as a power shovel, is dismantled in

our shop, the heavy pieces are placed on dollies and taken out on the runway and thoroughly cleaned before the men begin to work on them. The smaller pieces are put in metal baskets and dipped into a vat of hot solution, which cleans them properly before they are worked on. We have a special paint room.

This company is about 25 years old. Several men connected with our Equipment Section have had not less than 20 yr. experience in the construction equipment field. Most of our shop mechanics have had not less than 10 yr. experience in the rebuilding and maintenance of construction equipment. Our parts manager has been in the parts business more than 20 yr. With the equipment we have available, combined with our new building and the experience of our personnel we believe that we are in an excellent position to repair and rebuild construction equipment, particularly on war projects.

Able Mechanics Are Key to Equipment Service

By H. D. ANDERSON

General Manager.

Charleston (W. Va.) Tractor & Equipment Corp.

HOUSED IN A MODERN FIREPROOF BUILDING of brick, steel and glass construction, our equipment service facilities occupy a floor space of 9,240 sq. ft., in addition to 4,000 sq. ft. under the same roof for the storage of machines waiting to be overhauled or already reconditioned or repaired. Included in this space are a paint room, a blacksmiths' shop and a wash room.

The shop is under the capable direction of Dewey Mullins, an experienced welder, mechanic and machinist who can

operate not only any of the shop equipment, but also all of the types of machines that are brought in to be serviced. While not a graduate engineer, Mr. Mullins has no trouble "engineering" any work given to him and the jobs turned out of the shop under his supervision may include: An engine and generator be mounted together to make a light plant; a truck winch mounted on a tractor; or a worn-out engine in a concrete mixer replaced by a new, modern one of a different design and speeds. A tractor-mounted blower unit was designed in the shop, field-tested and then turned over to a national manufacturer to be built on a production basis. Many manufacturers have taken advantage of the combination of severe operation conditions in West Virginia and the facilities of the experienced Charleston Tractor & Equipment Corp. organization to field test, develop and refine their products.

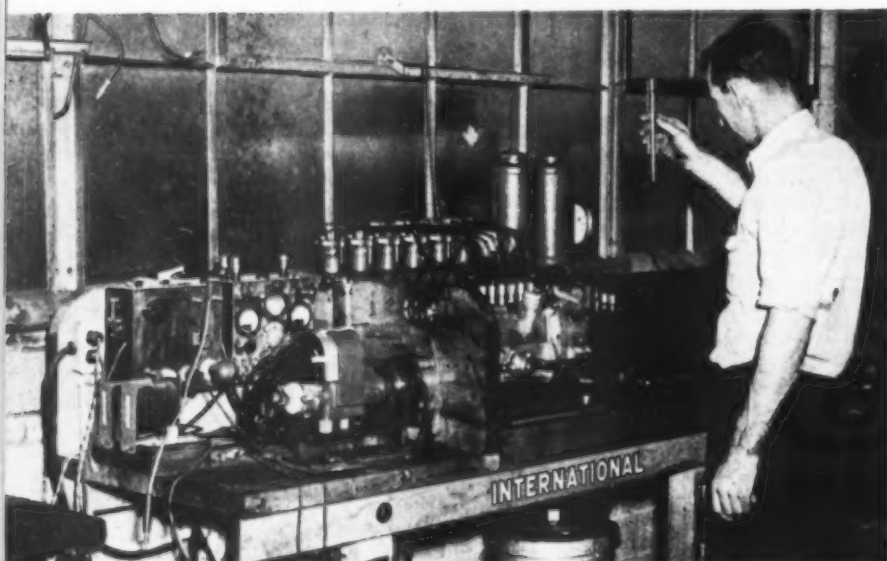
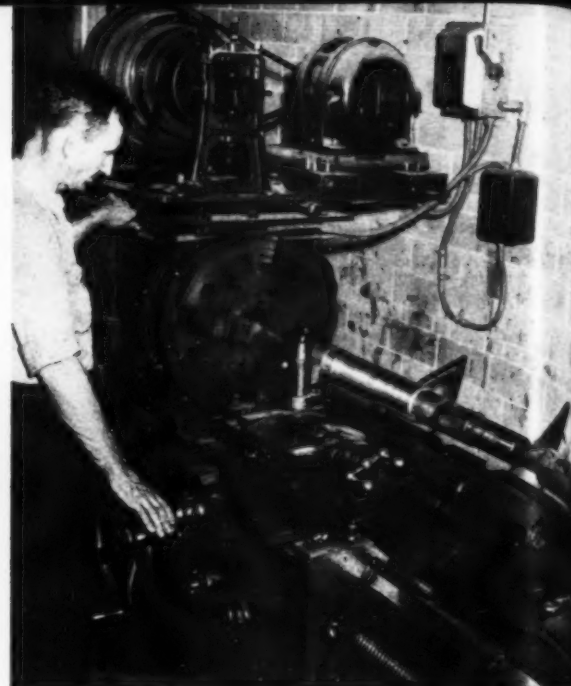
Large doors and plenty of overhead clearance make it possible to service any type or make of construction equipment in the shop. Traveling overhead cranes are available for handling heavy sub-assemblies. All lathes, drill press and other shop machines are driven by independent motors, doing away with all line-shafting. A special bench is provided for the testing and charging of magnetos; there are also special benches for hydraulic and diesel pumps, and the latter are run by electric motors so that the amount of fuel pumped can be accurately metered and set. Diesel injectors can be tested so that they will function properly and release at the proper pressures.

Another service performed by the shop is the filling of



MODERN FIREPROOF BUILDING of steel, brick and glass construction houses offices, salesroom and shops of Charleston Tractor & Equipment Corp.

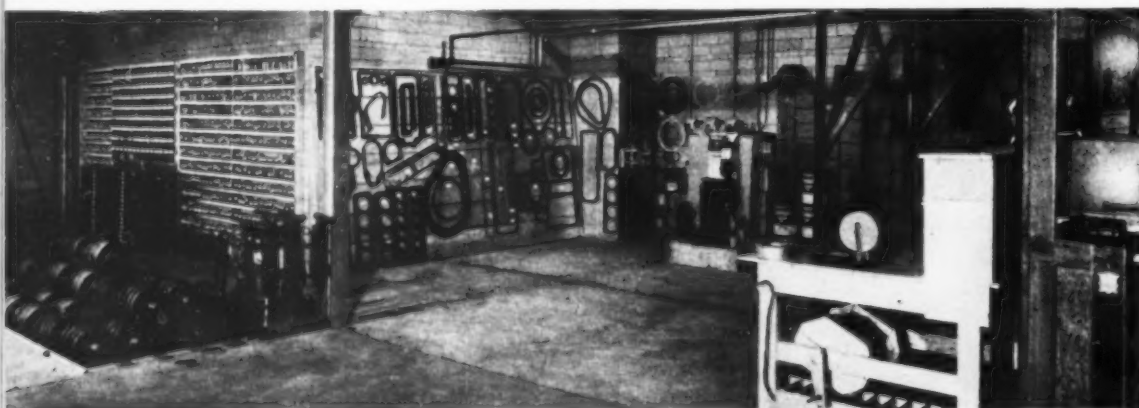
LATHES AND OTHER MACHINE TOOLS (right) enable Charleston shop to handle all kinds of construction equipment repairs.



TESTING EQUIPMENT for diesel pumps and injectors and for magnetos performs a useful service at Charleston shop.



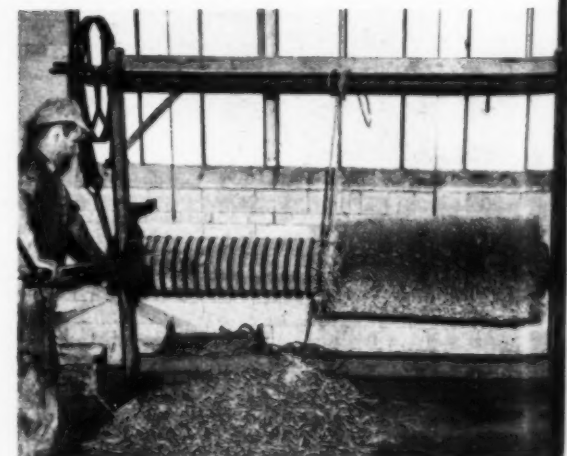
IN BLACKSMITH SHOP at Charleston plant, equipment is provided for reconditioning detachable drill bits by hot-milling and retempering.



OVERHEAD CLEARANCE (below) large doors and effective lighting are features of shop of Charleston organization.

PARTS DEPARTMENT (left) of Charleston company carries large repair stocks, including gaskets of various sizes and types mounted on panel in background.

FILLING OF BROOM CORES (below), either wire or fiber, for power-driven street sweepers is handled with special equipment at Charleston shop.



broom cores, either wire or fiber, for different sizes of power-driven sweeper brooms.

With the ever increasing necessity for the saving of critical materials, the welding and shop equipment is worked overtime. Many worn parts are built up and machined down; scarifier and dipper teeth are re-pointed and hard-surfaced with manganese.

Formerly, in West Virginia, detachable bits were discarded or in some cases reground once on an emery stone. They were not re-tempered, and consequently, being soft, gave very little service. With the new equipment now available, the bits are milled while hot, then re-tempered in pyrometer-controlled furnaces and, consequently, give as good service as new bits. Large bits can now be hot-milled several times before being scrapped.

An average staff of 20 men is maintained, five of whom

have fully equipped company service cars for answering calls in the field. Monthly service meetings are held to keep the men posted and to help train new men. Also, some of the men are sent to factories of firms represented by the company so that new ideas and methods may be learned by them. Service men are provided with the best and latest small tools available, and air lines are piped to convenient points so that impact wrenches and other air tools can be used when needed.

To speed up repair work, the building is so designed that the Parts Department is adjacent to the Service Department. Here on 4,000 sq.ft. of floor space are heavy industrial steel bins, shelving, cabinets and drawers to accommodate one of the largest repair stocks in the East. To give customers good service on machines being overhauled, it is essential to have the parts in stock and not to have to tie up machines, as well as floor space, while waiting for parts from the factory.

Shop Rebuilds Both Light- and Heavy-Duty Machines

By MORTON R. HUNTER

President, Hunter Tractor & Machinery Co.,
Milwaukee, Wis.

AN ACCOMPANYING PICTURE shows our present plant. The building to the south of our office building was formerly a structural steel plant which we took over several years ago. It has two 50-ft. craneways 300 ft. long, with 5-ton electric overhead cranes, extending over a railroad track so that we can load from cars or load on to cars and move right back into the building. To the rear of this building a year ago we added a modern machine shop with concrete floor, Iron Fireman heating system, and new plumbing. Behind the office building is our old machine shop where we rebuild heavy machines such as cranes, shovels and pavers, many of which weigh as high as 40 to 50 tons each. The new machine shop is used for lighter machines, such as pumps, mixers, air tools, air compressors, etc.

Our machine tool equipment consists of lathes, shaper, 100-

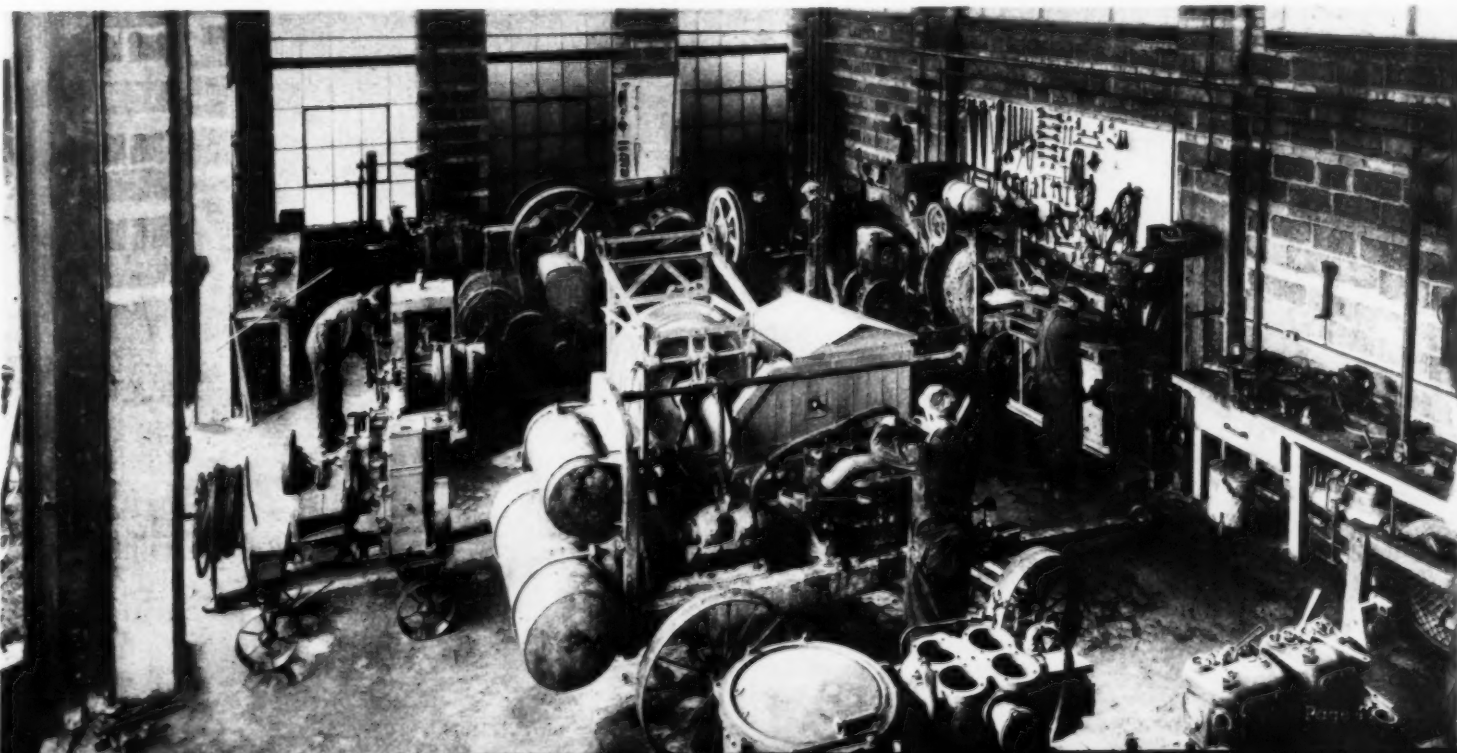
ton press, blacksmith outfit, Lincoln welding outfits, acetylene cutting torches and numerous other tools necessary to do a complete rebuilding job on any construction machine.

We employ 2 truck drivers, 2 parts men, a master mechanic, a timekeeper and 14 high-grade mechanics, all expert on steam, gas, electric or diesel power and on general repair operations. The average length of employment with us is 10 yr. and some of our men have been with the company as long as 25 yr. We have been rebuilding machinery at the rate of about \$150,000 worth a month or more and we are shipping all over the country, from Florida, North Carolina, South Carolina, Georgia, Virginia, Pennsylvania, and New York out to Seattle, Nebraska and elsewhere.

We have an excellent Parts Department and carry stocks

(Continued on page 51)

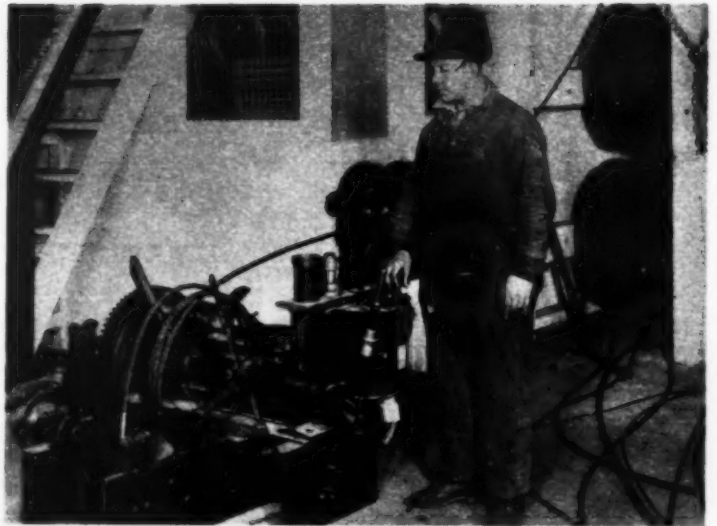
WIDE VARIETY of construction equipment is shipped to shop building (below) of Hunter plant for repair or complete overhauling



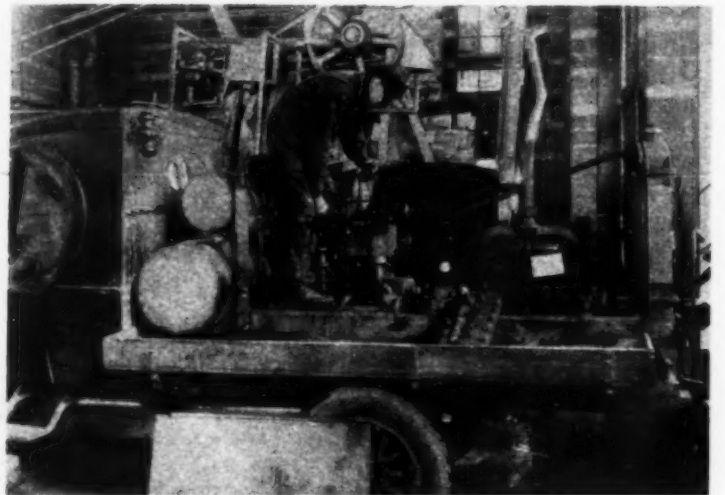
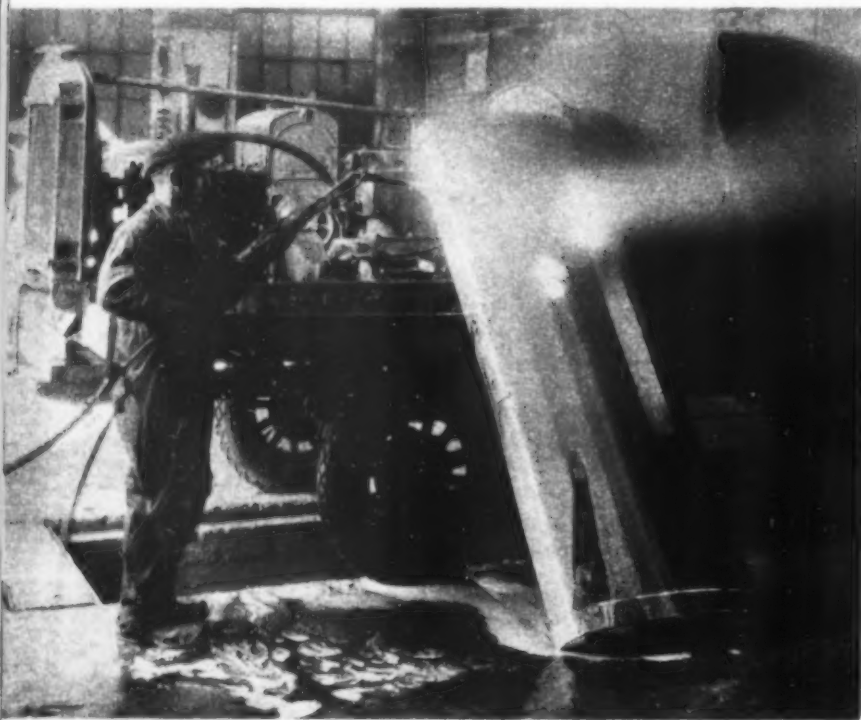


OFFICE BUILDING of Hunter Tractor & Machinery Co., at right, is flanked by shop (formerly a steel plant) equipped with two 50-ft. cranes 300 ft. long extending over railroad tracks to facilitate handling of incoming and outgoing equipment.

WIRE ROPE (right) from reels at Hunter shops is accurately measured and cut to desired length by special electrically operated machine.

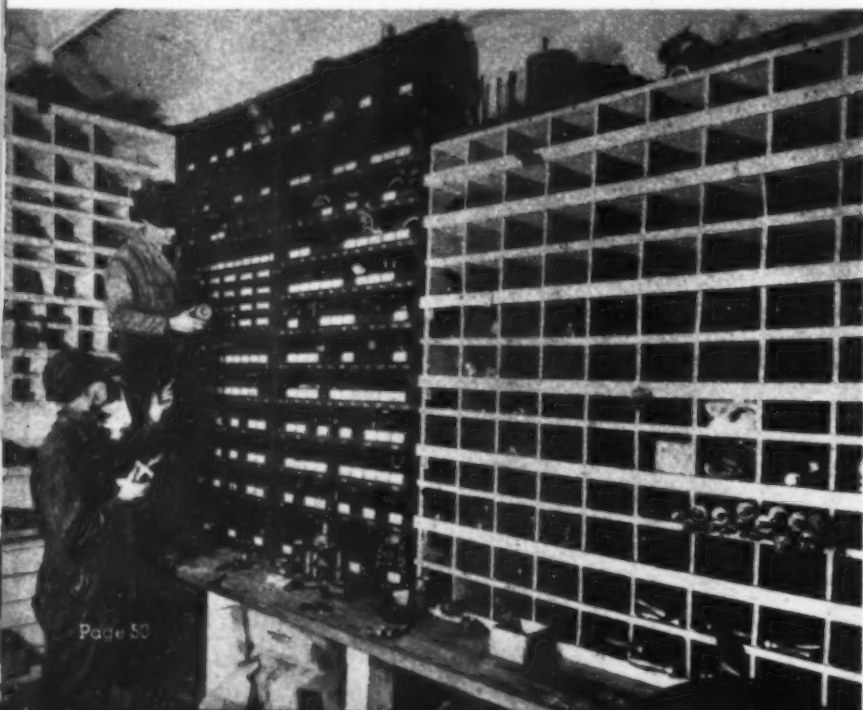


PRIOR TO REPAINTING (below) all parts of equipment rebuilt at Hunter shops are thoroughly cleaned by high-pressure steam and chemical gun.



TYPICAL RECONDITIONING JOB at Hunter shop involves complete overhaul and rebuilding of truck-mounted Sullivan air compressor. Mechanic here is removing cylinder head to clean out carbon and inspect pistons and valves.

STOCK ROOM (below) at Hunter plant enables mechanics to obtain without delay necessary parts for repair of construction equipment.



WITH PROPER SHOP EQUIPMENT (below) valves of air compressor unit are ground and resealed by member of Hunter mechanical staff.



of parts for the companies we represent, such as Chain Belt, Sullivan and others, in addition to parts for the various types of gas engines that are on the equipment we sell.

We handle wire rope by the carload and have developed our own wire-rope cutting and winding machine, which is equipped with an electrically operated device for measuring accurately, without slippage, any desired length of wire

rope. With this equipment it is possible to unwind, measure and cut off, for example 180 ft. 2 in. of wire rope, tie it up and deliver it to a customer within a few minutes after he calls for it.

Accompanying photographs illustrate steps in a typical shop operation—the general overhauling, cleaning and painting of a 110-cu.ft.-min. Sullivan air compressor.

Delay in Repairing Equipment May Prove Costly

By Wm. H. ZIEGLER
President, Wm. H. Ziegler Co., Inc.,
Minneapolis, Minn.



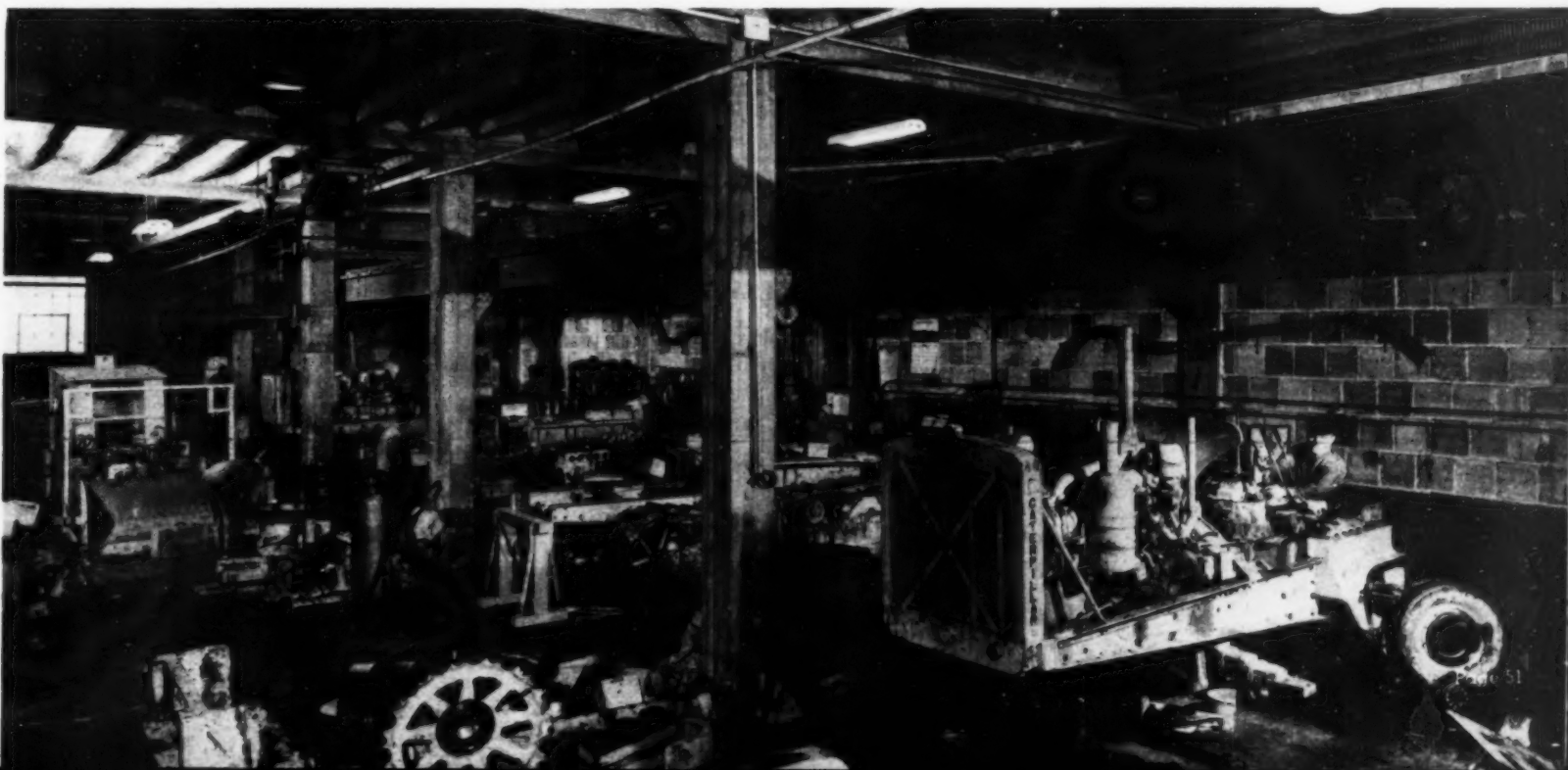
SPECIAL TOOL made out of old shaper at Ziegler shop grinds track roller flanges. Track roller mounted on bed of shaper and turned by small motor is moved sideways against high-speed grinding wheel.



CLUTCH AND BRAKE BANDS are riveted with automatic, self-fed machine (at left) by Ziegler mechanic.

IT IS REAL ECONOMY to have construction equipment repaired or rebuilt to maintain its productive capacity and extend its useful life. As part of its service facilities, the Wm. H. Ziegler Co. maintains a staff of factory-trained mechanics and service men in its modern, well-equipped repair shops. As illustrated in the accompanying photo-

ENGINES ARE LIFTED FROM FRAMES (below), prior to starting repair work, by 10-ton overhead crane at Ziegler shop.



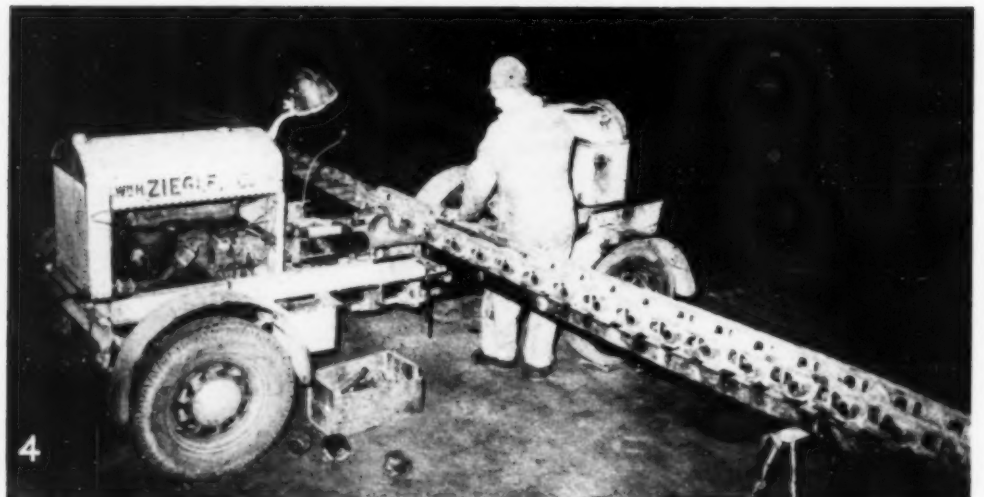
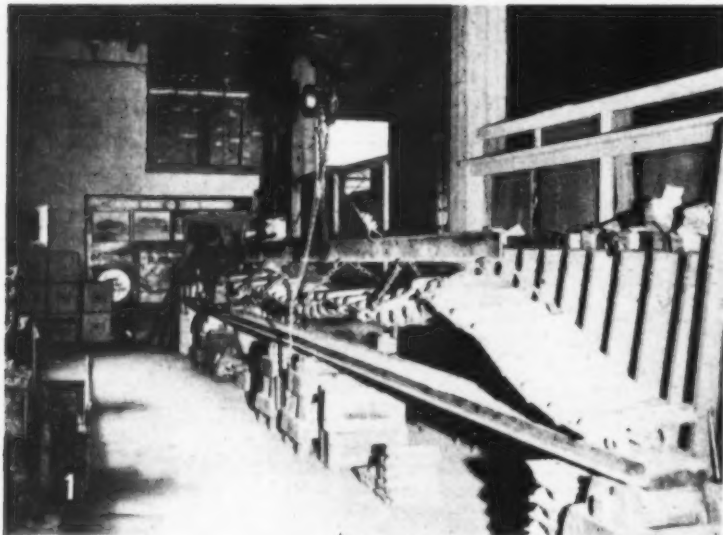
graphs, specially trained men perform special jobs, and the proper machines and tools are available for handling every kind of repair or overhauling operation on construction equipment. In addition, a large stock of spare parts is maintained for instant use.

To owners of construction equipment these few words of advice are offered: Don't wait until you need your equipment on some job before having it reconditioned or repaired. You have a big investment in your machinery. Don't wait until it is beyond repair—have it put in condition now. Remember, in these war times it cannot be replaced.

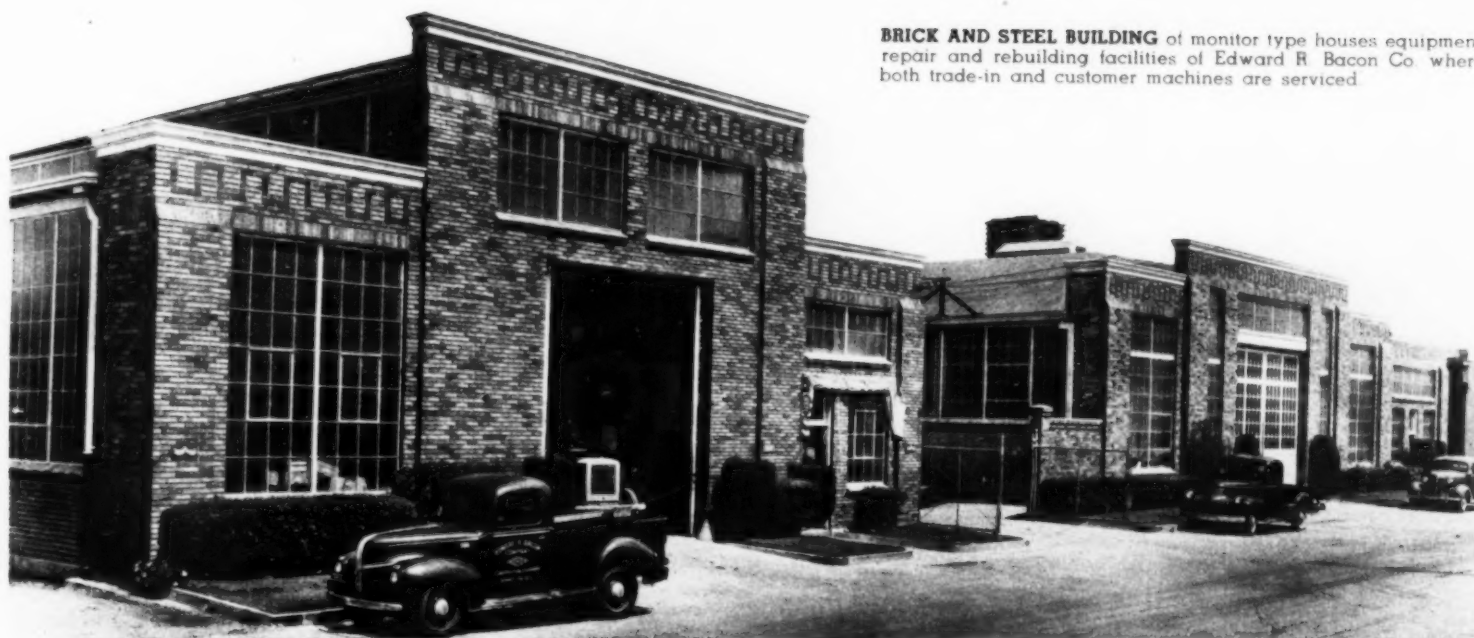


ACCURATE ADJUSTMENTS (left) of diesel fuel pumps and injection valves are made with special tools at Ziegler shop.

WELDING TRUCK is maintained by Ziegler organization for making on-the-job repairs to equipment. Arc welder is powered by truck motor. Truck also carries oxyacetylene welding and cutting equipment.



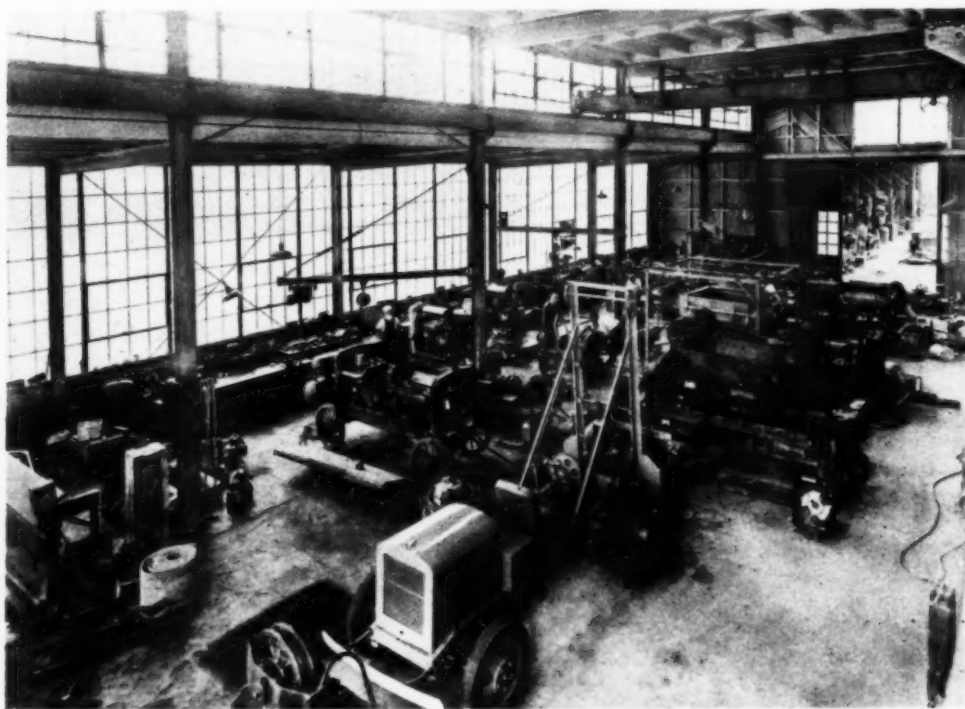
TOOLS FOR REPAIRING TRACTOR TRACKS at shop of Wm. H. Ziegler Co. include: (1) Special I-beam lifting device, with chain and hooks, which raises entire unit to track bench; (2) special wrench developed by Wm. H. Ziegler removes bolts and nuts from tracks without breakages; (3) compressed air wrench speeds replacing of shoes on tracks after repairs are completed; (4) portable hydraulic press removes and replaces track pins and bushings. In addition, shop is equipped with similar 150-ton stationary press.



BRICK AND STEEL BUILDING of monitor type houses equipment repair and rebuilding facilities of Edward R. Bacon Co. where both trade-in and customer machines are serviced.

Used Equipment Rebuilt and Yard-Tested

By **PAUL W. MOHR**
Manager, Oakland Branch, Edward R. Bacon Co.,
San Francisco, Calif.



REBUILDING OF EQUIPMENT by Bacon company is done in shop served by bridge crane. On each side of craneway are bays containing mechanics' work benches.

EDWARD R. BACON CO., which has been distributing construction equipment for the past 32 yr. operates a repair shop in conjunction with its Used Equipment Division, located in Oakland, Calif., for the purpose of reconditioning trade-in and customer machines. Since the recent boom in construction, this repair shop has been expanded to a considerable extent.

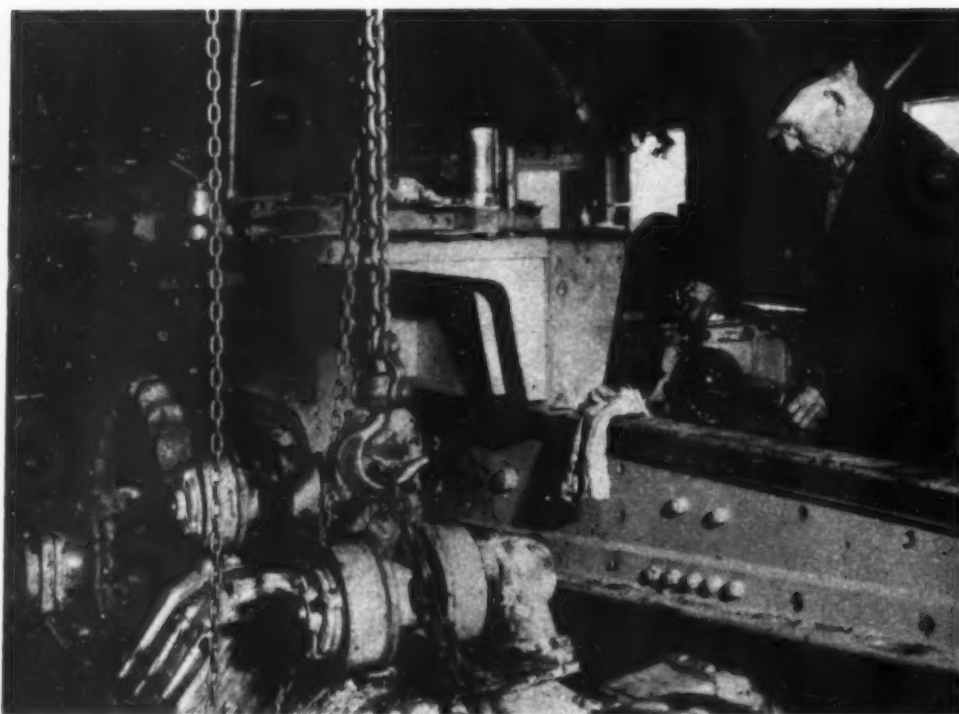
The organization in the Oakland shop consists of Manager Paul W. Mohr, Shop Superintendent M. F. McCorkle, the clerical staff and the shop members, as well as the sales staff. Upon receipt of a machine at the shop for repair, an "In Tag" is made, showing delivery of the machine to the shop; then a job number is assigned the machine and a work order is made and placed at the time clock. The machine is dismantled and steam-cleaned, washed or sand-blasted, as the case may be, and a survey is made to determine the parts necessary for reconditioning.

Parts are Reclaimed

Serviceable parts are rechecked and then rebuilt. Large gears, shafts and buckets, are reconditioned to new parts' specifications. Parts that are too costly to rebuild, or too special, are ordered from the manufacturer. Work is continued on the machine until completion of the job. The machine is then yard-tested and final adjustments are made, before painting. A field service man is often sent with a machine to the job for final adjustments in cases where this service is warranted.

Repair work is carried out in the Company shop, which is a brick and steel building of the monitor type, having a full length bridge crane. On each side of the craneway are bays, containing the work benches of the shop men. Each bay is equipped with a job crane having a 1-ton capacity electric hoist to facilitate handling of sub-assemblies when dismantling machines.

Facilities for unloading equipment
(Continued on page 128)



CHASSIS OF DIESEL TRACTOR is rebuilt in shop of Ball organization. Sprocket visible at left has been rebuilt.

CONTRACTOR'S CENTRAL SHOP

Maintains and Repairs

EARTH-MOVING EQUIPMENT

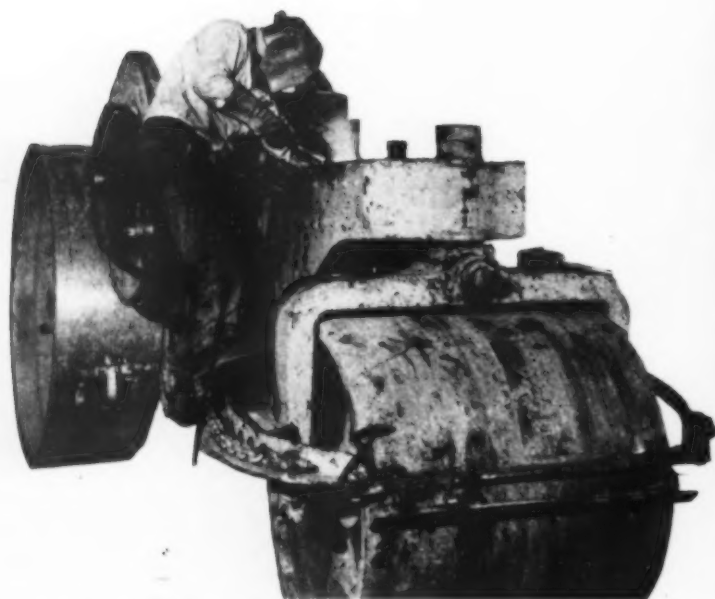
MAINTENANCE OF EQUIPMENT has always been a matter of major importance to N. M. Ball Sons, Berkeley, Calif., contractors. It had been their regular practice to maintain field shops and portable units for taking care of scrapers, tractors and rollers on the job, and to have lubrication outfits at work at the end of every shift. But last year the three heads of the firm, Irv, Stan and Gordon Ball, sat down in their office and gave the subject of maintenance a more thorough going over. It all added up to something like this:

They were doing 2½ million dollars worth of business a year. Most of it was big-yardage earth-moving of the type type that, even in normal times, taxes equipment to the limit. Under the unusually severe conditions of construction for war needs, with demands for almost continuous day and night operation to meet rush progress schedules, it was found that the useful life of equipment was being drastically curtailed. Much of the Ball organization's work called for the construction of airports and the building of roads on the strategic network or for access to points of military or industrial importance.

Large Equipment Inventory

The company's equipment inventory was large. On the list were 15 scrapers of 12- to 28-cu.yd. capacities. Three of LeTourneau's new Tournapulls came next, followed by an even two dozen Caterpillar D-8's, three D-6's, four Caterpillar and two Adams motor graders; two Northwest and one P&H shovels; 12 road rollers, both Austins and Buffalo-Springfields; Ford and GMC trucks; and assorted compressors, jackhammers, sheepfoot rollers and other units.

The Ball brothers reviewed the priorities situation and it didn't look too



CONVERSION OF OLD STEAM ROLLER for modern usage involves installation of gasoline engine, new transmission and chain drive.



TOLERANCE OF PART for tractor diesel engine being overhauled is checked by Keith Shepard, shop foreman.

promising. Already new equipment units were hard to get, and parts were becoming scarce. The future, they reasoned, was even less hopeful. All signs pointed to the need of revising their maintenance procedure to make what they had stretch longer. Field maintenance was all right for those days when all one had to do was call up the distributor, place an order and get new parts within a few hours. Now, however, a central, well-equipped shop was indicated as a necessity.

So they went to work on plans, and within a few months moved into new quarters at Third and Delaware Sts., Berkeley. The facilities include a streamlined office, a yard containing about 70,000 sq. ft. of area, and a shop structure 40x90 ft. in plan. The entire area of the shop is covered by a bridge crane equipped with a handhoist; a shed for parts' storage and small parts' welding has been erected along the entire length of the building. Situated alongside the property is a spur track, useful for shipping heavier units, such

Information in this article
is based on an interview with
BILL SORENSON
Master Mechanic
and
KEITH SHEPARD
Shop Foreman
N. M. Ball Sons, Contractor
Berkeley, Calif.

as shovels, when they are to go to jobs far away.

Every type of equipment comes into the shop for complete overhaul. Tractors receive the greatest amount of service as there are more of them than other types of equipment. The work done on one of these units is fairly well illustrative of that practiced on all others.

First, the tractor is given a steam cleaning under a pressure outfit outside the shop. Then it is taken in and stripped down. Greatest wear on a tractor is generally found in the track assembly—idler wheels, tracks and drive sprockets—exposed to the action of abrasive materials. Whenever possible, Master Mechanic Bill Sorenson and Shop Foreman Keith Shepard like to get to the machine before wear on the sprockets becomes excessive. Using a tough alloy steel welding rod, plus a welder who knows how, they can rebuild worn teeth if they aren't too far gone. The welder cuts a metal template and bulds up to it. Given a good job, it isn't even necessary to grind it smooth afterward. And even if the rim is worn beyond repair, they don't throw away

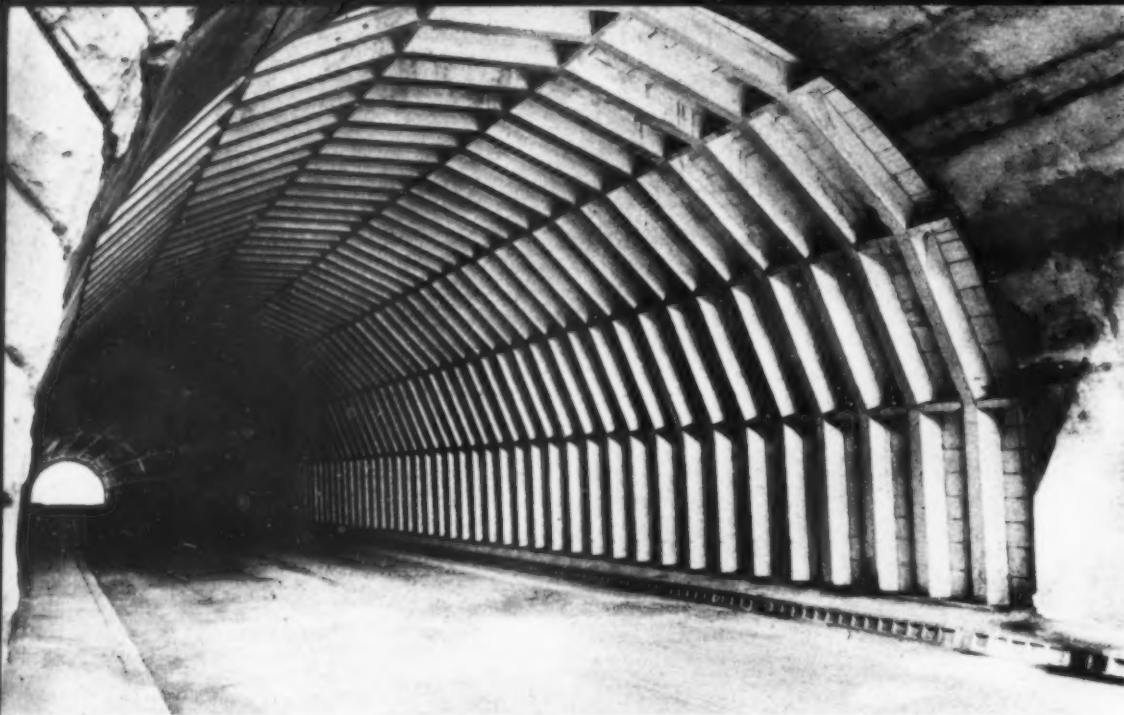
(Continued on page 139)



THESE TRACTOR-SCRAPER UNITS, operated by N. M. Ball Sons to move 500,000 cu.yd. at West Coast Army camp, are kept running by periodic maintenance and repair at contractor's central shop. Sandy soil is tough on track-laying mechanism, engines and other working parts.



PATROL GRADERS of type here illustrated, shown sloping bank on California highway, are checked regularly and repaired when necessary to prolong useful life.



STEEL IS CONSERVED by lining Wolf Creek highway tunnel in Oregon with Wolmanized timber, pressure treated by American Lumber and Treating Co. and spray-painted with three coats of white lead. Vertical beveled faces of curb recesses are painted with white traffic lacquer as aid to motorists. Kern & Kibbe, contractors, of Portland, Ore., built the tunnel for the Oregon State Highway Commission, of which R. H. Baldock is chief engineer.



STEEL PIPE LINE from Wichita Falls, Tex., to Childress, Tex., is salvaged for relaying in new line to carry oil to rationed East. Old line is cut into lengths of 30 to 60 ft. by electric torch.

Wide World Photo

HOW

They Did It

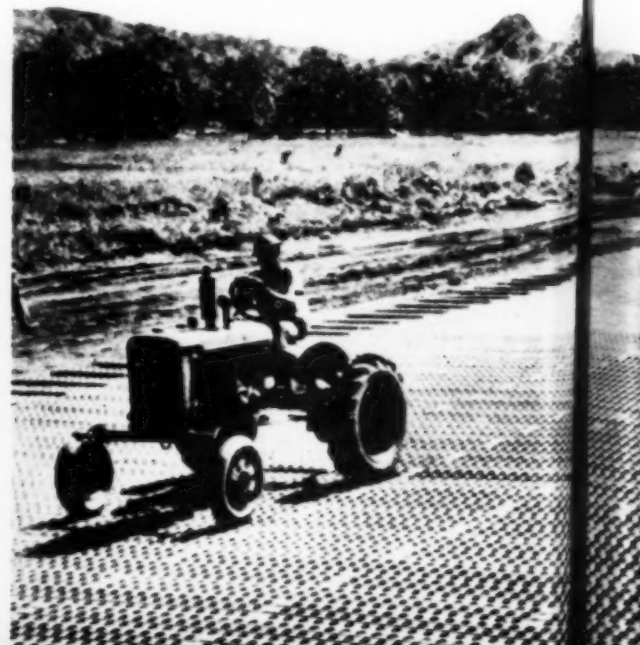
CONSTRUCTION DETAILS

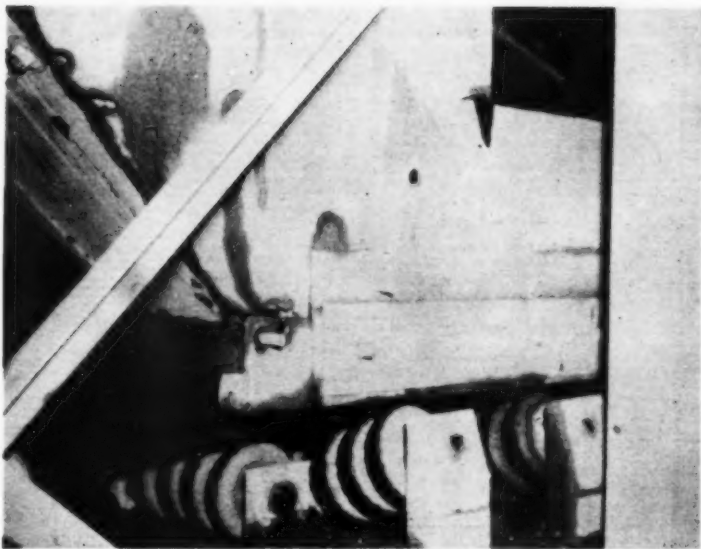
*For
Superintendents and Foremen*



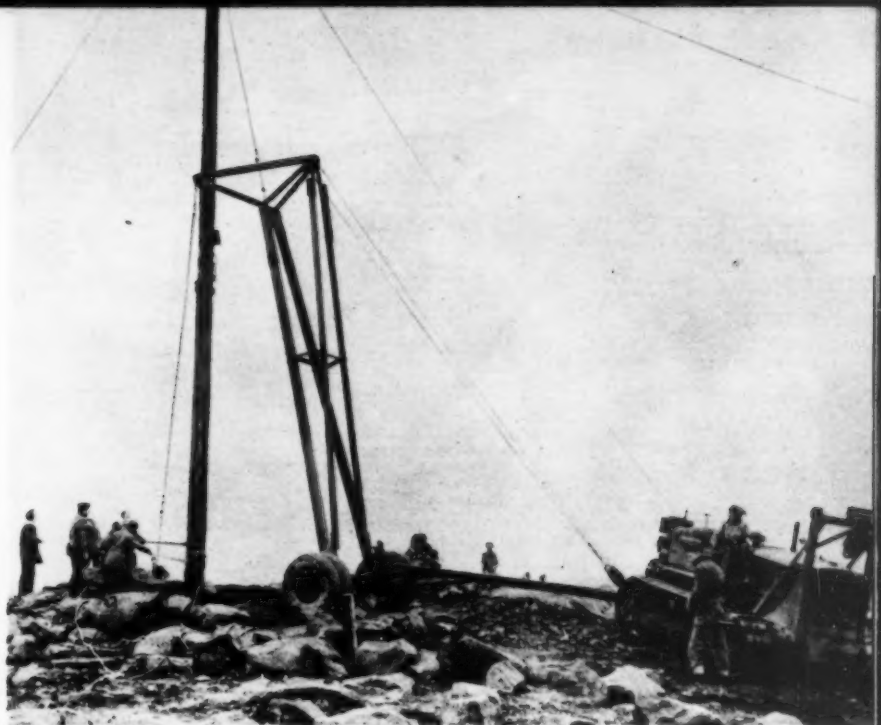
STEPPING UP CAPACITY of 1½-ton Chevrolet truck to 26,000-30,000 lb., Thornton four-rear-wheel drive installed in standard truck conserves critical material and gives greater range of speed and flexibility.

CARELESS AND WRONG-WAY DRIVING (below) are made difficult by islands, or neutral areas, bounded by barriers 9 in. wide and 3 in. high made of plant-mixed bituminous material by California Division of Highways. Original installation can be cheaply altered.

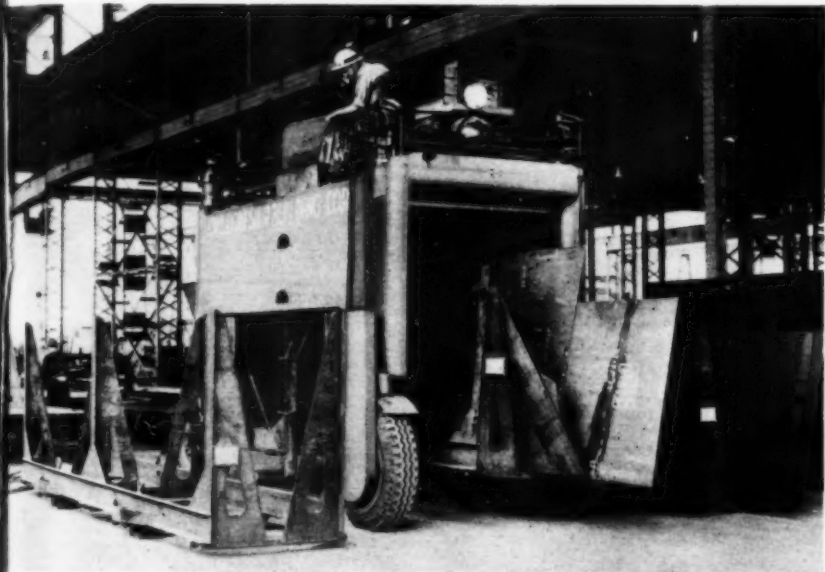




PNEUMATIC TIRES ABSORB IMPACT at transfer points on 9-mi. belt conveyor at Shasta Dam, U.S. Bureau of Reclamation project in California. Twelve 8x2.50 tires make up each troughing roller at points where material is chuted to a lower flight.

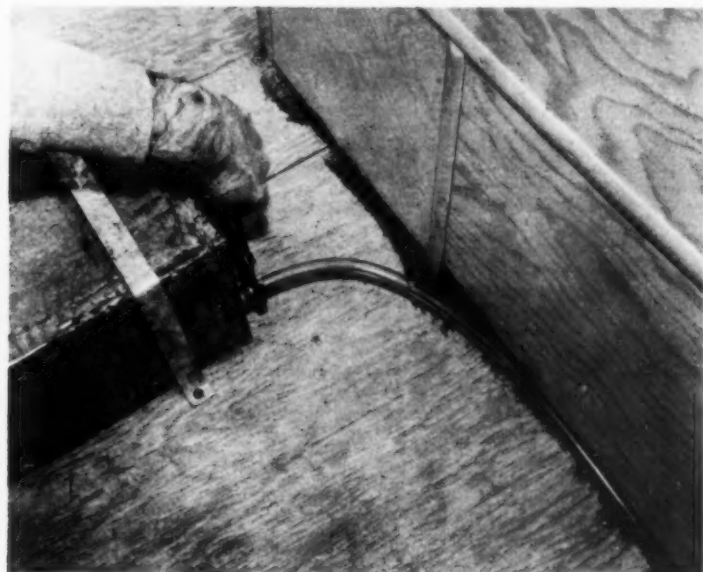


RADIO ANTENNAS are erected on wind-swept hill at off-shore Army base by Le Tourneau tractor-crane powered by Caterpillar diesel D7 tractor. U.S. Army Signal Corps Photo.



STACKED IN SPECIAL RACKS, cut and formed steel plates for shipbuilding are picked up by Willamette Hyster "straddle truck," or lumber carrier, and are hauled to site of work. Truck pauses only momentarily to pick up loaded rack; carrier can transport up to 30,000 lb.

Wide-World Photo



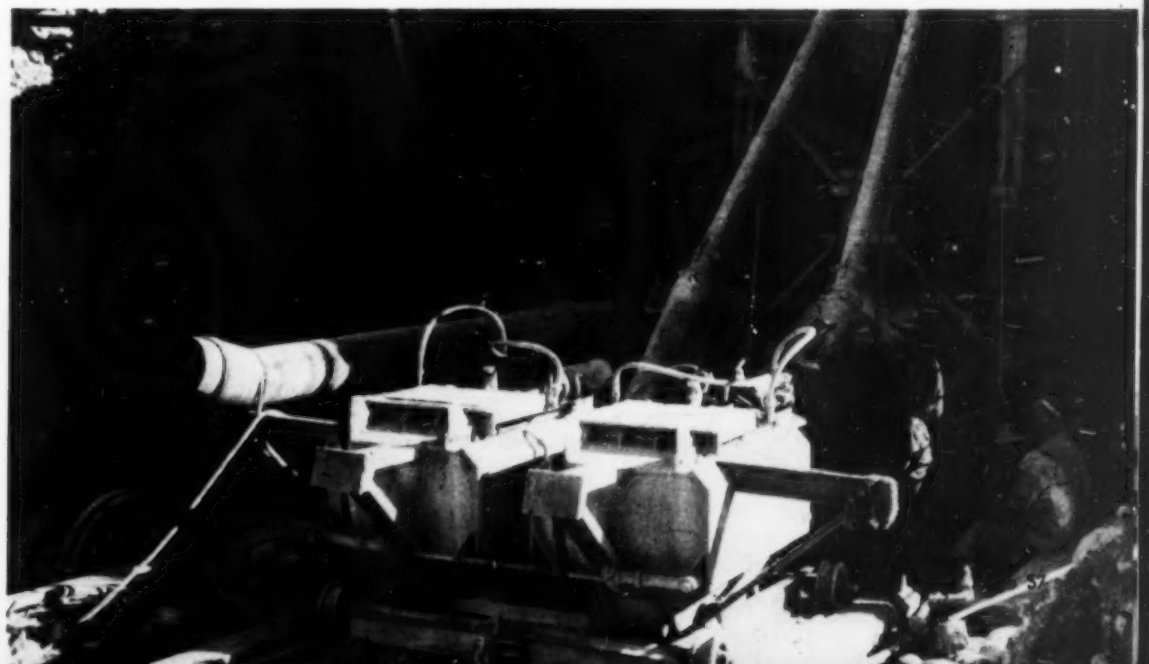
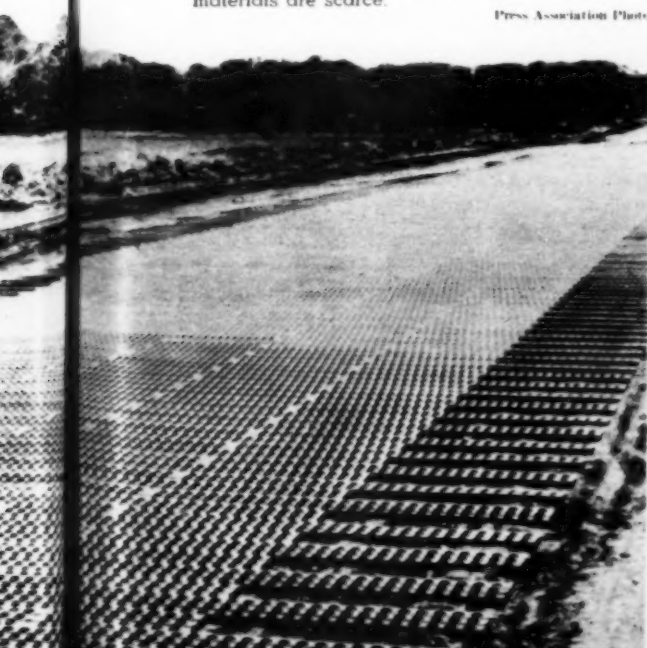
PLASTIC WATER LINE is installed in a Western trailer coach to carry cold water at 135 lb. pressure. Transparent Tenite-2 can be given a sharp and permanent bend when softened by heat. Tubes of this material have carried 1,200 lb. per sq. in. air pressure, but should not be used for water warmer than 120 deg. Fahrenheit.

EASILY HANDLED STEEL MATS (below) distributing load of heaviest bombers, are employed to surface air fields at locations where usual paving materials are scarce.

Press Association Photo

BACKING OUT OF TUNNEL PORTAL (below) on Shasta Dam railroad relocation is twin unit installation of Pressweld concrete gun used to line bore.

Photo by Bransby





AIDED BY AUTOMATIC TOOLS, such as this Skilsaw sander, Pacific coast building contractors for Army are completing their work on time.



THIS 6-IN. BLADE (left) cuts through 2-in. stock like hot knife going through butter. Skilsaw model not only has large capacity but is portable and compact for use in inaccessible places.



FINISHING OF CONCRETE FLOORS is done with gasoline-driven White-man automatic floor finisher. Does work of 10 men more accurately than hand work.



NO BRUSH

Small Tools SPEED

By A. E. NIEDERHOFF

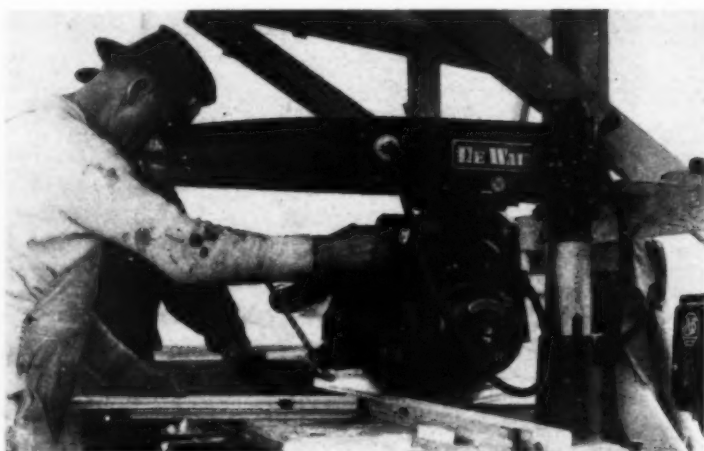
Senior Structural Engineer, U.S. Engineer
District Office, Portland, Ore.

STRONG & McDONALD, of Tacoma, Wash., contractors building Army cantonments in the Northwest, make extensive use of small tools to assist the carpenter, sheet metal worker, roofer and painter in building better houses faster. The painter, for instance, no longer stirs his paint with a wood paddle. He now has an electrically powered mixer which is attached to the edge of a 5-gal. bucket, to perform this service.

Brush work is not used where painters are expected to cover about five times the area that they painted by hand before the Japs dropped bombs on Pearl Harbor. A spray gun with 15 lb. of air at the gun and 70 lb. in the pot allows one man to average 1,200 sq. ft. of coverage per hour.

Roofers use a pressure gun to spread plastic cement beneath asbestos shingles. This gun is shaped like a pistol; the handle grip leverage allows tremendous pressure with ordinary effort. A variety of nozzles is available, making the gun useful for calking boat decks, window frames, pointing

(Continued on page 128)

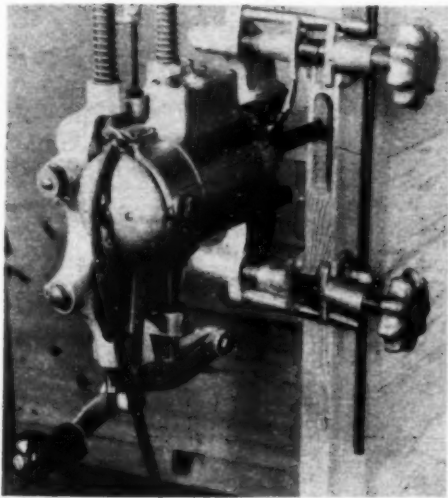


GENERAL PURPOSE SAW, DeWalt unit mounted on cantilever arm and powered by 7½-hp. motor operating at 3,600 r.p.m., cuts 22,000 b.ft. of rafter stock daily to speed up cantonment construction.



COMBINATION SAW AND JOINER powered by 1-hp. motor is Boice crane machine with 10-in. saw blade and 8-in. joiner. Only skill required of operator is to set guides correctly.

EDCANTONMENT CONSTRUCTION



LOCK MORTISING is done with Carter automatic-feed tool, adjustable to any thickness of door. Average time per door is 2 min., including time for connecting tool.



SHEET METAL, up to 20 gage for box corners and curved flanges, is notched quickly and accurately by tools of this type made by R. J. Hamlet and Whitney Metal Tool Co., both of Los Angeles. Tinsmiths using shears can do only one-third of work done by an apprentice using these tools. Notcher has adjustable gage giving any desired depth of notch up to 13 16 in.



MIGHTY MIDGET is this model of Stanley "Unishear" that cuts 20-gage sheet metal exactly on line without danger of sheared strips lacerating hands of operator.



STIRRING BATCH OF PAINT for application by spray guns is done with unit made by Mixing Equipment Co., of Rochester, N. Y. and powered by 1/4-hp. motor at 1,425 rpm. Uniform and constant suspension of pigment in vehicle for efficient spraying is provided by this machine which may be fitted with wide variety of blades that will cut, shred or fold material in container.



CONCRETE VIBRATOR manufactured by Mall Tool Co. is operated by 3-hp. gasoline engine that can be hauled around job in concrete buggy. Contractor saves time, fuel and materials with this machine which is used for few minutes at time in widely scattered areas.

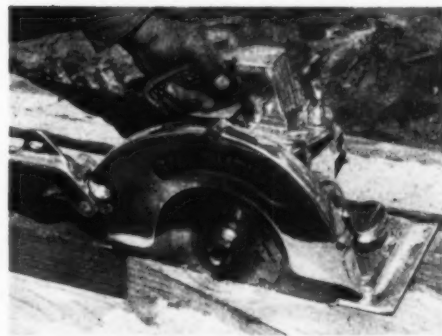


PRESSURE GUN is Kenmar unit used by roofers to spread sealer of plastic cement beneath asbestos shingles on Army barracks.



EVERY WOOD-WORKING CONSTRUCTION JOB (left) has its portable electric drills, similar to this Skilsaw 3/4-in. heavy-duty drill. A 1 1/2-in. bit is being used to bore bolt holes in truss at speed of 375 rpm.

LARGE LUMBER STOCK (right) calls for 10-in. saw blade that is portable and dependable. Made by Porter Cable Machine Co., of Syracuse, N. Y., this unit is used on Army cantonment construction in Pacific Northwest.



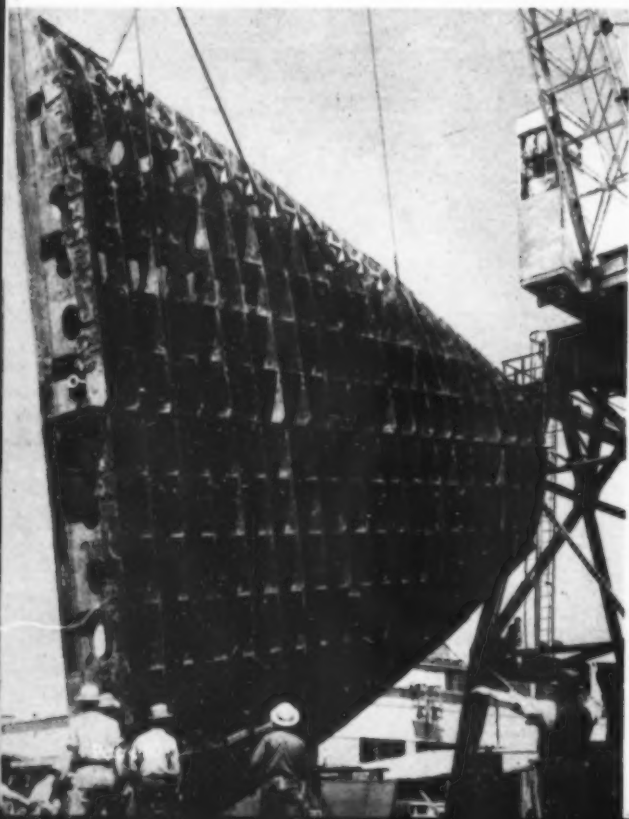
TYPICAL BUILDINGS of army cantonment include mess halls and barracks built of timber with aid of variety of small tools.





ABOVE BREATH-TAKING FLOW from spillway of Grand Coulee Dam, U. S. Bureau of Reclamation project in Washington, workers weave network of reinforcing steel for east powerhouse, which eventually will house nine generators each having output of 108,000 kva.

INNER BOTTOM SECTION (below) of prefabricated ship for U. S. Maritime Commission is handled by gantry crane of 42-ton capacity at yard of Henry J. Kaiser's organization on West Coast.



WHITE-HOT RIVET is 'sure-fire' cigarette lighter for Wesley Ayling, U. S. Bureau of Reclamation rivet heater on scroll case in Grand Coulee Dam powerhouse.

JOBS

oddities



DRAGLINE BUCKET cut into six pieces by thieves and sold as scrap is retrieved by police and shipped back to airport contractor who re-welds fragments into whole bucket by means of standard Hobart 300-amp arc welder.



STEEL SCRAP in 5-ton chunk is loaded by shovel working over slag dump at Bethlehem Steel Co. plant, Steelton, Pa. Lumps as large as this "spill" formerly were often discarded because breaking them up to size for recharging into furnace was too costly and difficult. Now they are being reclaimed, lanced with oxygen torch and broken to charging size with dynamite to yield sorely needed scrap.



On-the-Job Maintenance KEEPS TRUCKS IN SERVICE FOR DURATION



By D. T. STANTON, Director of Service, Dodge Division, Chrysler Corporation

D. T. STANTON

RECOMMENDED TRUCK LUBRICANTS

Atmospheric Temperature, Deg. F.	Engine Oil	TRUCK PARTS AND THEIR PROPER LUBRICANTS				
		TRANSMISSIONS			REAR AXLES	
		Three-speed	Four- & five-speed	Hypoid Gears	Spiral Bevel and Double Reduction	Two-Speed
Below - 10	No. 10-W plus 10% kerosene	(See note 1 below).	(See Notes 1 and 2 below).	(See Notes 3 and 4 below).	(See Note 3 below).	(See Note 5 below).
As low as - 10	No. 10-W					
Below Zero		SAE 80 gear lubricant, or SAE 90 gear lubricant plus 20 percent No. 10-W engine oil.	SAE 80 E.P. mild, or SAE 90 E.P. mild gear lubricant plus 20 percent No. 10-W engine oil.	SAE 80 (Truck Duty Type) for extended periods of these low temperatures.	SAE 80 E.P. mild, or SAE 90 E.P. mild gear lubricant plus 20 percent No. 10-W engine oil.	
Above Zero				SAE 90 Truck Duty hypoid lubricant (INACTIVE TYPE)		
As low as + 10	No. 20-W					
Zero to 32		SAE 90 low-cold-test gear lubricant.	SAE 90 mild or low-cold-test gear lubricant.		SAE 90 E.P. mild, low-cold-test gear lubricant.	
As low as 32	SAE 30					
Above 32		SAE 140 gear lubricant	SAE 140 E.P. mild gear lubricant		SAE 140 E.P. mild gear lubricant.	
Not lower than 90	SAE 40					
Up to 100						SAE 90 E.P. mild or truck duty lubricant.
Above 100						SAE 140 E.P. mild or truck duty lubricant

(1) Three-speed and four-speed transmissions should be drained and refilled every 15,000 mi. and seasonally, as indicated on chart above.

(2) Five-speed transmissions should be lubricated every 10,000 mi. and seasonally.

(3) Rear axles should be drained, flushed with flushing oil and refilled every 15,000 mi., in accordance with chart.

(4) Truck hypoid axles require an inactive type of hypoid lubricant which is different from the active type used in passenger car hypoid axles. A simple test for the proper lubricant is this: Place a polished strip of copper in the hypoid lubricant for about 30 min. at normal room temperature. If the copper turns black and

becomes coated with a black substance, the lubricant is of the active type. If the lubricant is inactive, the copper strip may become slightly discolored, but it will not be covered with a black substance. Truck Duty hypoid lubricant (inactive type) is satisfactory for use in passenger car hypoid axles, but hypoid lubricant (active type) should not be used in truck hypoid axles.

(5) Two-speed rear axles should be drained, flushed with flushing oil (not kerosene) and refilled every 15,000 mi. The axle should be filled until the lubricant overflows from the overflow plug hole. This filling requires about 7½ qt., or 15 lb. of lubricant. After filling, insert plug and add about 1 pt. of lubricant, using filler hole at top of carrier to supply this extra lubricant required to fill the differential and planetary unit. Do not overfill.

FOR THE DURATION, truck transportation in this country must depend mainly on trucks already in service. Only a thin line of reinforcements in the way of new vehicles will be available. Thus maintenance of equipment now in use becomes all important.

Pressure from two sides puts most truck operators today in a perplexing position. Trucks must be on the job more hours per day, more days per week. The temptation to overload and operate at top speeds is greater than ever. Yet these overworked trucks will have to stick it out to the end.

Therefore, proper maintenance, with the accent on *preventive* measures, becomes the truck operator's first duty and, in many cases, his only salvation, because, unless he can "Keep 'Em Rolling," he cannot stay in business.

Driver an Important Factor

Under wartime conditions the driver becomes more than ever before an important factor in truck maintenance. It may well be said that preventive maintenance begins with the driver. Careful driving prolongs the life of both truck and tires. Carelessness on the part of the driver today borders on sabotage, and, if habitual, can be more harmful than occasional mistakes made by inexperienced drivers. If the truck is driven properly in the first place and kept in good condition mechanically, the owner obtains maximum efficiency, economy and durability. With truck and tire production restricted, durability is highly important, but no more so than efficiency and economy. Too much emphasis cannot be placed on the careful selection, training and checking of truck drivers.

Other conditions being equal, proper

and regular lubrication will do more to prolong the life of a motor truck than almost any other maintenance operation.

Lubrication schedules differ for different makes of trucks. Owners should follow the manufacturers' recommendations in all cases. Generally speaking, certain parts of all trucks should be lubricated every 1,000 mi. and other regular lubrication operations should be performed every 2,000, 6,000, 10,000 and 15,000 mi. A variety of lubricants is required to lubricate the modern motor truck adequately. The important points are: (1) to use the right grade and weight of lubricant to meet all requirements of climatic and operating conditions and (2) to lubricate the vehicles according to schedules recommended by the manufacturers.

Proper attention to lubrication of the transmission and rear axle prolongs the life of these units. Use of the proper lubricant at these points during cold weather prevents sacrificing power that would otherwise be required to turn gears against stiff, ineffective lubricant. To make sure your truck will deliver the maximum mileage that has been built into it, be sure that it is properly lubricated in accordance with the accompanying chart on truck lubricants.

Strict Inspection Necessary

The modern motor truck is designed and engineered mechanically to stand up in service with a minimum of attention. Margins are allowed for certain degrees of negligence and even abuse. Present conditions, however, stress the necessity for strictest inspection and care of mechanical units.

The battery should be kept in good condition and inspected frequently to make sure that it is filled with pure water. In summer, water should be added about once a week and about every two weeks in winter. The condition of the cables should be watched constantly to make sure they are in good condition.

Generators in motor trucks today are capable of producing current output ample to meet the requirements of the increased use of electrically operated accessories in addition to that required for lights and horns. Periodic inspection and cleaning of brushes and commutator will insure the ability of the generator to produce its full current capacity. Inspection of insulation on all wiring will insure that this current is delivered in full volume to the places where it is needed.

To insure full power output and maximum fuel economy, it is important to check engine timing and make sure it is correct.

Ignition Timing

In low altitudes with standard brands of non-premium gasoline, the engine will give its best performance if timed

(Fig. 1) as indicated in the following chart:

Dodge Truck 1st W Series	Piston Position*	Degrees of Crankshaft Rotation*
WC	T.D.C.	T.D.C.
WD	T.D.C.	T.D.C.
WF, WM, WFM	T.D.C.	T.D.C.
WG, WGM	T.D.C.	T.D.C.
WH, WHM	T.D.C.	T.D.C.
WK, WL	.003 in. B.T.D.C.	2 in. B.T.D.C. (with 5.2 head)
WK	.003 in. A.T.D.C.	2 in. A.T.D.C. (with 5.8 head)
WL	.003 in. A.T.D.C.	2 in. A.T.D.C. (with 5.8 head)

* T.D.C. — top dead center;
B.T.D.C. — before top dead center;
A.T.D.C. — after top dead center.



Fig. 1 . . . IGNITION TIMING is regulated by setting crankshaft in proper relation with piston position. Chalk mark (1) shows dead center for crankshaft on timing ring graduated in degrees; light (2) aids mechanic in making proper setting.

With the foregoing timing there will be a trace of spark ping from 10 to 30 mph. When accelerating with wide open throttle from 10 mph.

When using lower grade fuels, or after carbon has accumulated, spark ping may be excessive with the specified timing. In such cases the ignition should be re-

tarded not to exceed 4 deg. (.007 in.) later than specified timing.

In high altitudes there is less tendency for spark ping, and the same thing is true in low altitudes when using premium gasolines. In such cases improved performance may be obtained by advancing the spark not to exceed 4 deg. (.007 in.) ahead of specified timing.

Within the foregoing limits, i.e., from 4 deg. (.007 in.) earlier to 4 deg. (.007 in.) later than specified timing, a good rule to follow is to advance the spark until a slight ping is audible when accelerating from 10 mph. with open throttle.

The distributor should be moved clockwise to retard and counter-clockwise to advance the ignition.

Distributor Adjustment

Using a Timing Indicator over No. 6 cylinder, as shown in Fig. 2, bring the piston up on the compression stroke to the position shown in the foregoing chart.

Loosen the clamp bolt and rotate distributor body until breaker points just start to open. This may be checked by means of a test lamp connected between the distributor primary terminal and the battery terminal of the generator regulator. When the points are closed the light will be on, and as soon as the points break the light will go off. Press the distributor cam lightly against the direction of proper rotation so as to remove all backlash. Minor changes in ignition timing may be obtained by loosening the distributor lock plate and hold-down screw and rotating plate slightly in the proper direction.

Spark Plugs

Spark plug electrodes should be cleaned frequently in a sandblast-type cleaner to remove deposit formed by use



Fig. 2 . . . TIMING INDICATOR screwed into head of No. 6 cylinder on six-cylinder engine enables mechanic to adjust piston to proper position for adjusting timing. Test lamp connected between distributor primary terminal and battery terminal of generator regulator goes off as soon as break occurs between distributor points.

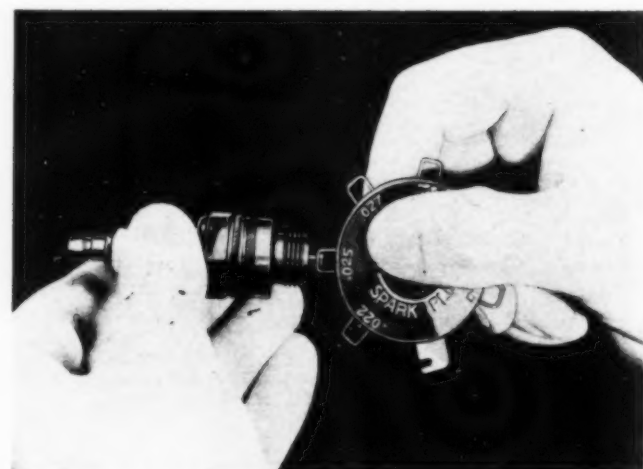


Fig. 3 . . . ROUND FEELER GAGE checks correct spark gap between side and center wires of spark plug. All adjustments should be made on side wire, as bending of center wire may crack porcelain.

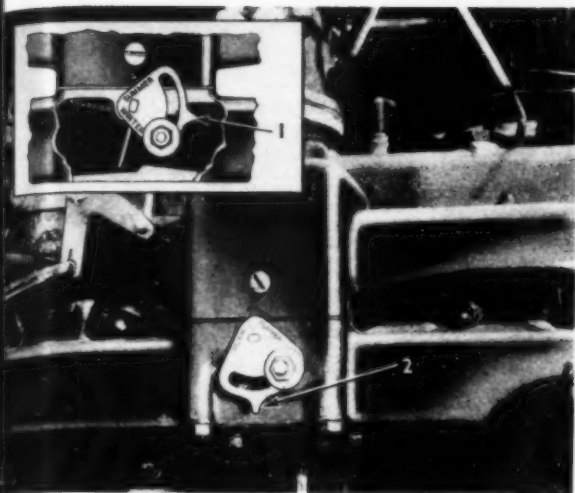


Fig. 4 . . . **HEAT CONTROL SHAFT** on exhaust manifold regulates amount of heat delivered to inlet manifold. Locking plate on heat control shaft is adjusted according to season of year.

of chemically treated fuels for high compression engines. Porcelains should also be cleaned every 2,500 to 3,000 mi.

After cleaning the spark plugs, the gap should be adjusted to .025 in., using a round feeler gage (Fig. 3). Make all adjustments on the side wire of the plug. If the center electrode is bent, the porcelain may crack, resulting in plug failure. Properly spaced and properly functioning spark plugs will affect operating economy as much as 10 percent. New spark plugs should be installed every 10,000 mi.

Fuel Must Be Conserved

The necessity for fuel conservation to facilitate the military effort stresses the need for special care of fuel systems in motor trucks. Fuel as well as tanks and fuel lines should be kept free of water and all foreign matter. Fuel filters should be cleaned regularly and kept in top-notch working condition.

The manifold heat control should be checked to make sure it is functioning. This device conserves fuel by hastening the "warm-up" of the engine. It should not be neglected, particularly under present conditions, and if not functioning properly it should be either replaced or repaired.

The exhaust manifold is equipped with an adjustable heat control which regulates the amount of heat by-passed around the inlet manifold heater body. Summer and winter positions are provided on the locking plate on the heat control shaft, as shown by Fig. 4. The position of the valve should be regulated according to the season of the year.

Correct carburetion is the key to fuel economy. The carburetor, however, is a delicate instrument, and it is safe to say that in a majority of cases, engine trouble that is first diagnosed by the average operator as faulty carburetion can be traced to some other source. As a general rule it is best to check ignition, compression and all other factors affecting engine operation before tampering

with the carburetor. But if the engine does not idle smoothly even though the ignition appears to be in good condition, valve clearance uniform and compression good, and if manipulation of the idle adjustment on the carburetor does not result in smooth performance, then it is time to consult a service man qualified on carburetors.

Valves Should Be Checked

Uniform and proper valve clearances are tremendously important to fuel economy. If engine power appears to be reduced, use of a compression gage may show that the valves are not seating right or that piston rings are worn. Low compression indicates that the engine should be opened and necessary repairs made. When the engine is not functioning normally, the sooner the valves are repaired the better. This usually will save replacements.

Compression should be tested (Fig. 5)



Fig. 5 . . . **COMPRESSOMETER** is used to make compression test on each cylinder while engine is turned by starter with all spark plugs out and throttle wide open.

while cranking the engine with the starter, all spark plugs out and the throttle wide open. Compression pressures depend on cranking speeds, engine temperature and compression ratio. If the reading is reasonably high and uniform, not varying more than 10 lb. between cylinders, the compression pressure may be considered normal. If the compression test shows an abnormal condition, it may be advisable to make an internal inspection of valves, pistons, rings, etc. An extremely low reading in two adjacent cylinders may indicate a blown-out cylinder head gasket.

Reconditioning Valve Inserts

Because of the hardness of the special valve seat inserts used in the exhaust valve ports, it is impossible to recut these seats. They must be reground with a

special grinding tool as indicated in Fig. 6.

Special valve-seat-insert reconditioning equipment has been developed. The following rules should be considered when using this special equipment: (1) Valve guides must be clean; (2) the upper end of the valve guide must be chamfered; (3) the valve guide pilot must fit snugly in the valve guide and be tightened securely in place; (4) the grinding stone must be trued for concentricity, on the diamond pressing tool; (5) the grinding stone must be operated dry to maintain proper grinding speed; (6) the finished seats should not exceed .0005 in. run out; check with indicator; (7) do not use valve grinding compound on valve seat inserts.

Inlet valves are not equipped with valve seat inserts and therefore may be reconditioned with standard valve seat cutting tools.

The intake valve seats in the cylinder block should be recut with suitable valve

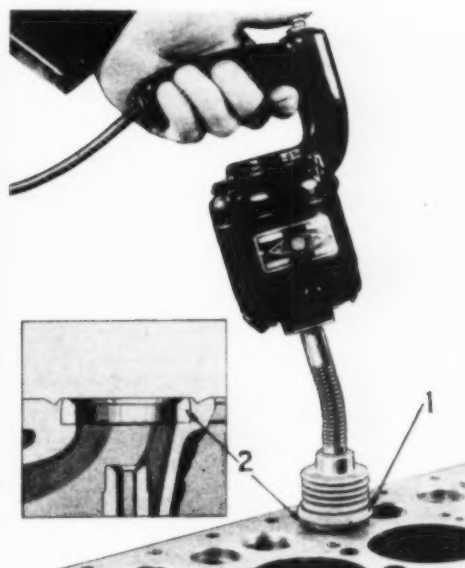


Fig. 6 . . . **SPECIAL TOOL** (1) grinds hard valve seat inserts used in exhaust valve ports. It is impossible to recut these inserts. Grinding stone must be trued for concentricity on diamond pressing tool and must be operated dry to maintain proper grinding speed.

seat cutter. The seats should be cut only enough to remove pits or other depressions in the seat. Then grind a new seat surface on the valve head with a valve grinding machine. When new seats are finished, the valves and seats in the cylinder block should be lightly lapped together with suitable valve grinding compound to assure a tight seat. The valve heads have plain surfaces and may be oscillated by means of a rod fitted with a vacuum cup and operated either by machine or by hand.

Considerable care must be taken to make certain that all grinding compound is removed from the valve, valve seat, intake port and cylinder block.

Oil is precious now and should not be wasted as it will be if piston rings are worn. When this condition exists, not only is oil wasted, but the truck owner



Fig. 7 . . . FEELER GAGE of proper thickness checks gap in piston ring set square in cylinder bore about 1 in. below top of engine block.

also risks running out of engine oil and damaging other parts of the power plant.

Piston Rings

Piston ring gap should be measured with the ring about 1 in. down in the cylinder bore to which it is fitted. Be sure the ring is square in the cylinder bore, and measure gap with proper thickness feeler gage (Fig. 7). Measure ring side clearance, as shown in Fig. 8, with feeler gage. Piston rings should be installed on the piston by means of a piston ring installing tool.

Gap clearance..... .007 to .015 in.
Side clearance in groove..... .0015 to .003 in.

When installing a new set of rings without reconditioning the cylinder bores, always remove any ridge in the top of the bore with a reliable ridge reamer. Care must be taken not to cut below the top of the upper ring position in the



Fig. 8 . . . SIDE CLEARANCE of piston ring in piston groove is checked with feeler gage.

bore, and where possible cut the ridge before removing the piston assemblies, keeping the tops of the pistons covered to prevent cuttings from reaching bearings, crankshaft and other vital parts.

Clutch Pedal

Careless operation or "riding" the clutch pedal will shorten the life of this unit considerably. A certain amount of free play or movement of the clutch pedal is necessary to compensate for wear of the clutch facing and to avoid slippage.

Unusual Noises

Truck operators should be constantly on the alert for any unusual noises in the transmission, rear axle or in universal joints. Immediate inspection to determine the causes of these unusual noises usually will prevent damage to the units that may result later in costly repair bills.

Correct Engine Temperature

An efficient cooling system will maintain a temperature of about 150 deg. F. in the truck engine, which assures full economy of operation and minimizes the

that may require expensive repairs or needless tire wear.

Brake Adjustment

Brake shoe adjustments are divided into two classes—minor and major. A minor brake shoe adjustment is made by moving the "toes" of the brake shoes. The toe of the brake shoe is the end which fits into the wheel cylinder; the heel is the opposite end, attached to the anchor bolt. The cams (Nos. 1 and 2 in Fig. 9) for adjusting the toes of the brake shoes can be reached from the outside of the brake support plate (Fig. 10).

Major adjustments are made by moving both the heels and toes of the brake shoes to centralize the shoes in relation to the drum diameter. To make a major adjustment, the wheel and hub assemblies should be removed.

Minor Adjustment (Except Booster)

Pedal travel is termed "free play" and should be approximately $\frac{1}{8}$ to $\frac{1}{4}$ in. This pedal free play can be felt readily by hand and is the movement of the pedal before the push rod touches the master cylinder piston. If necessary, this adjustment can be made easily by changing the



Fig. 9 . . . BRAKE SHOE ADJUSTING CAMS (1 and 2) for setting toes of brake shoes are turned "out", as indicated by arrows, to decrease clearance between toes of brake shoes and brake drum. To check toes of lined brake shoes in making major brake adjustment, as described in accompanying text, finger of brake shoe gage arbor is turned to "toe", as shown, and toes of brake shoes are adjusted until lining just contacts this finger.

formation of water and acid vapors in the crankcase. When anti-freeze solution is used, it is important to check the water pump, hose connections and cylinder head to make sure there are no leaks. If anti-freeze leaks into the engine, it will contaminate the oil, cause sticky piston rings and probably damage other engine parts.

Brakes that are in proper adjustment with facings in good condition not only assure adequate braking force to help prevent damage to the truck and its cargo through accidents, but also help prevent uneven and unnecessary wear

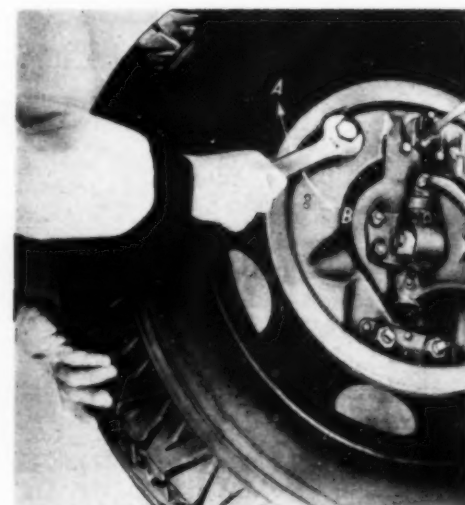


Fig. 10 . . . TURNING BRAKE SHOE CAM for minor adjustment of toe from outside brake support plate, direction A increases clearance and direction B decreases clearance between brake lining and brake drum.

length of the master cylinder push rod.

To adjust the brake shoe cams (Fig. 10), the following steps should be taken:

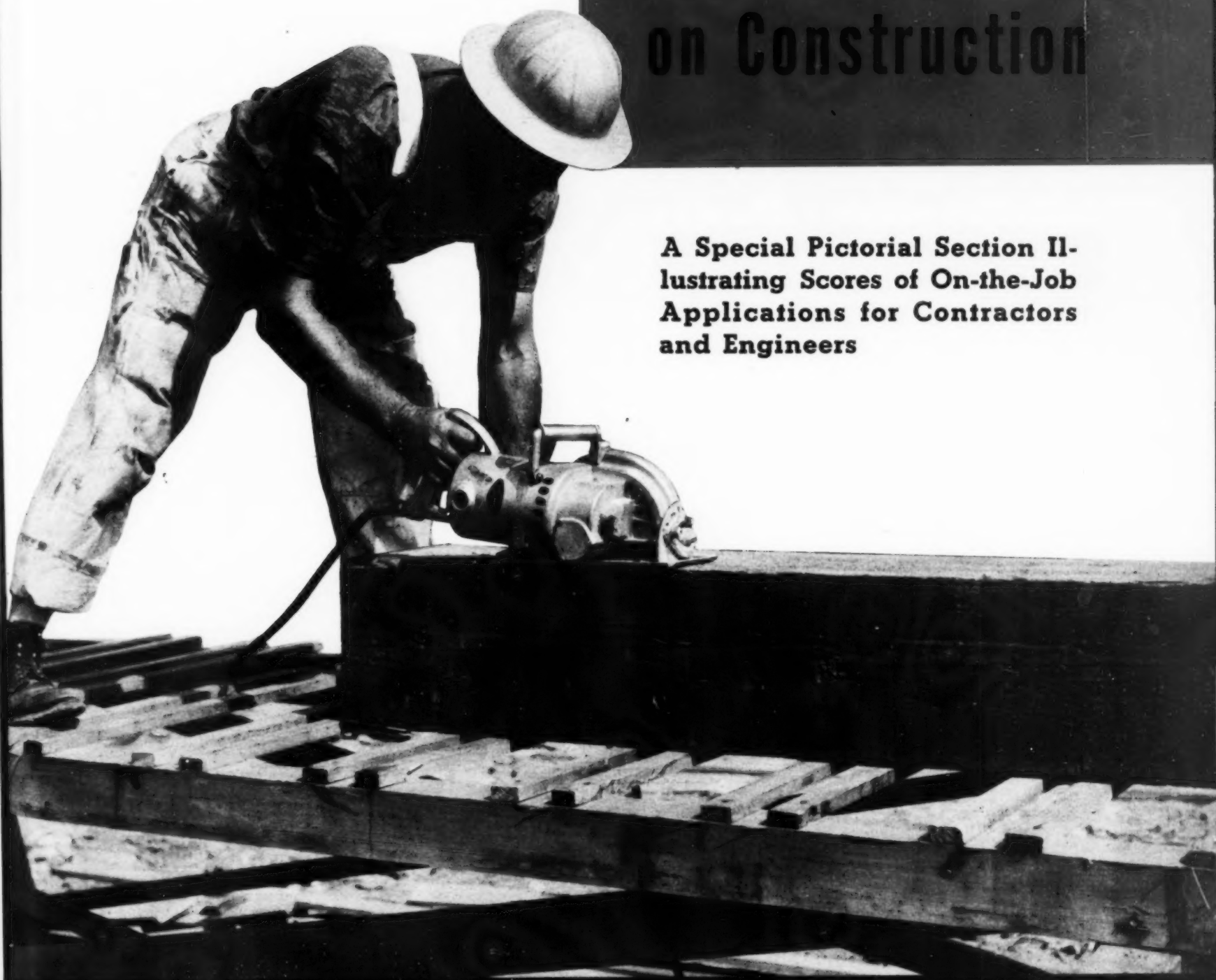
- (1) turn the brake shoe cam adjusting nut "out" until the front shoe lining is solid against the drum, and the wheel is locked, then back off the nut until the wheel may be spun without interference;
- (2) turn the cam on the rear shoe "out" at top until wheel is locked, then back off until free;
- (3) follow the same procedure at all four wheels.

A minor adjustment should be made when the brake drums are at room tem-

(Continued on page 134)

Small Tools on Construction

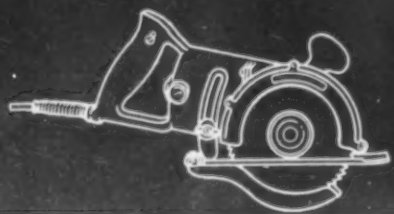
A Special Pictorial Section Illustrating Scores of On-the-Job Applications for Contractors and Engineers



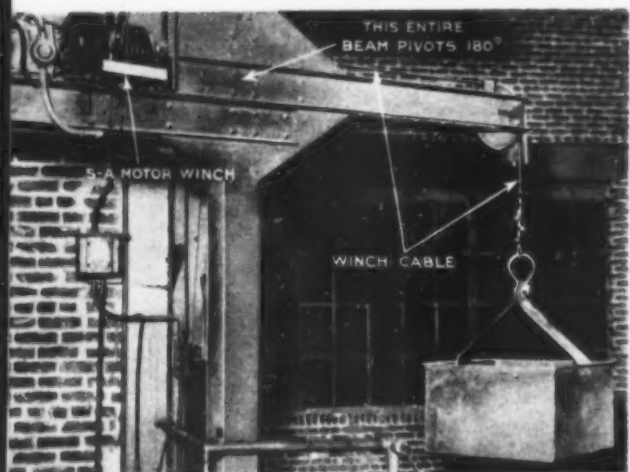
Every project involving engineered construction, whether it be large or small, calls for both heavy-duty and light-duty operations. Both are important if the job is to be done within the estimated limits of time and cost. While heavy-duty machines such as power shovels, cranes, draglines, concrete mixers, tractors, scrapers, motor trucks and air compressors have long been standard equipment on construction work, it is only within recent years that construction men have realized the opportunities for applying small portable tools powered by electricity, compressed air or gas, for scores of light-duty operations.

On construction for weir purposes, where mass production and prefabrication methods have been developed on a large scale, as in the case of mass housing, shipyards, army cantonments and naval bases, the range of small-tool applications is exceptionally wide.

Construction Methods presents herewith a special section of close-up, on-the-job action pictures illustrating scores of typical small-tool applications and indicating the great variety of services that these tools can be called upon to perform for contractors and engineers.
— Editor.



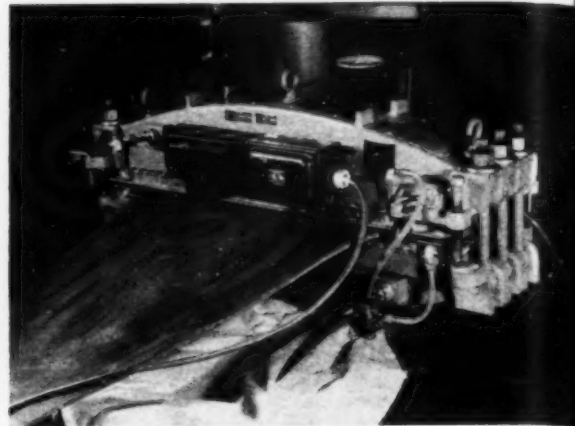
Small Tools



MOTOR-DRIVEN WINCH of Stephens-Adamson make proves useful piece of equipment for any job requiring lifting of heavy weights. Cantilever beam carrying loads swings through 180-deg. arc.



DRINKING WATER SERVICE for construction workers on job is provided by Ajax mobile drink-well and individual sanitary paper cups carried on back of water-boy. Galvanized iron tank of 17-qt. capacity is equipped with dust-tight cover, thumb-push faucet, 250-cup dispenser and waste cup bag. Weight of outfit, filled, is 48 lb.



ELECTRIC VULCANIZER repairs damage to 48-in. Goodrich conveyor belt. Clamping bolts provide 100-lb. per sq. in. pressure over entire belt surface. Heating elements operate at low temperature of about 287 deg. F.



DOUBLE-GUNNING on manganese steel bucket is done with Ingersoll-Rand riveting hammers.



ON DEMOLITION OF TIMBER STRUCTURE nuts on bolts are run off by Chicago Pneumatic impact-type wrench.



CONCRETE FOR FLOOR SLAB in industrial plant is consolidated by Master vibrator, powered electrically.

ATOMIZED OIL (below) is applied to wood forms for concreting at Grand Coulee Dam in Washington by Crown paint spray gun, instead of swabbing on with brushes.

Photo, U. S. Bureau of Reclamation



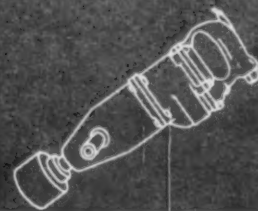
HARDSTEEL DRILL (below) puts 1/2-in. hole in 17-percent manganese steel tank shoe. Time-saving tool of Black Drill Co. is suitable for repair or maintenance of construction equipment when hardened steels must be drilled.



PORTABLE POWER UNIT (below) of Beaver manufacture, designed for bench or stand use, makes pipe machines of hand tools. Unit thread; pipe up to 2-in. diameter and bolts up to 1 1/2-in. diameter. Also operates geared cutters and threaders on pipe sizes up to 8-in.



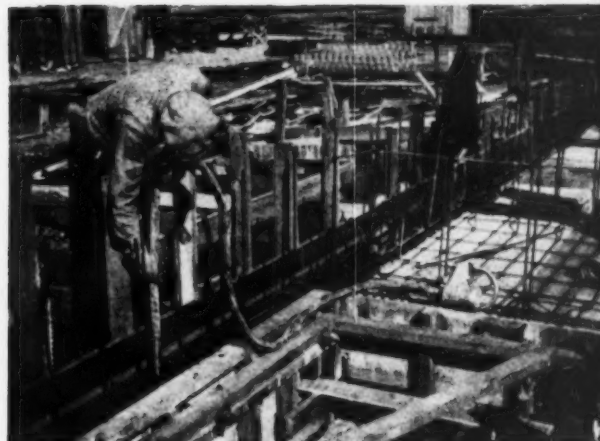
on Construction



FOR SPRAYING of painting materials, including red lead, white lead, mill white and casein paints, interchangeable multiple heads are feature of Paasche air-brush (left, above) weighing only 22 oz. All working parts are fully inclosed in strong machined brass body to protect against damage



FOR STREET WIDENING job in Memphis, Tenn., concrete sidewalk is broken by Thor paving breaker operated by compressed air from Le Roi portable compressor.



CONCRETE IN WALL FORMS on defense construction job is consolidated and distributed around steel reinforcement with aid of Viber electrically powered concrete vibrator.



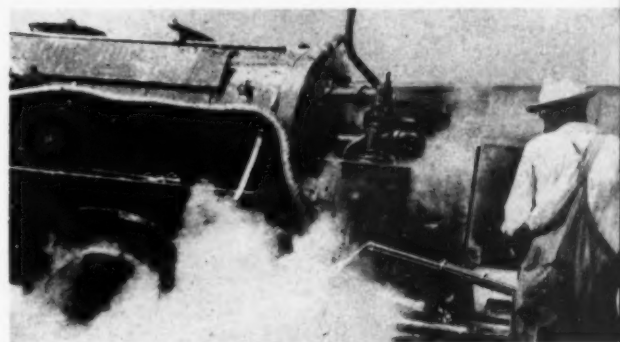
PAVEMENT CUTS (above, left) for street repairs are made quickly with Thor medium-weight paving breaker powered by compressed air.



STEEL FLAGPOLE is moved horizontally a distance of 9 ft. to new foundation through narrow trench as 10-ton Blackhawk jack shoves against concrete block. Steel tube extensions are added to ram of jack as pushing progresses.

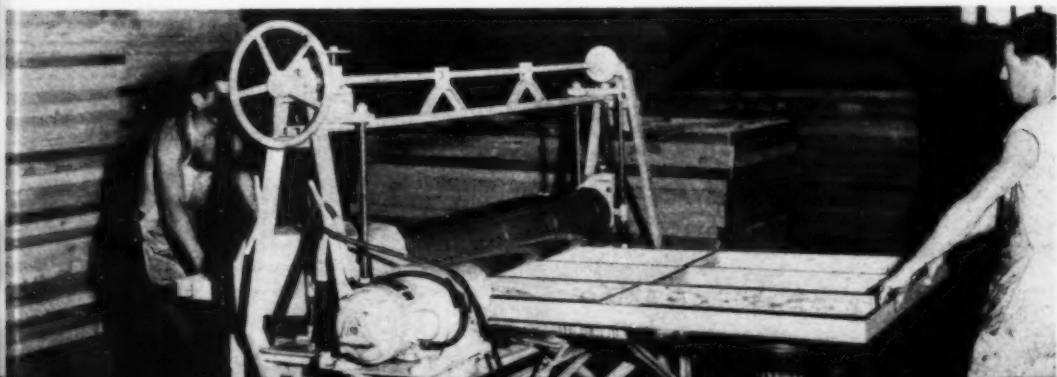


SELF LOCKING SAFETY WINCH is used by painters to raise and lower Patent Scaffold Co. hanging scaffold on 34-story McGraw-Hill Building in New York City.

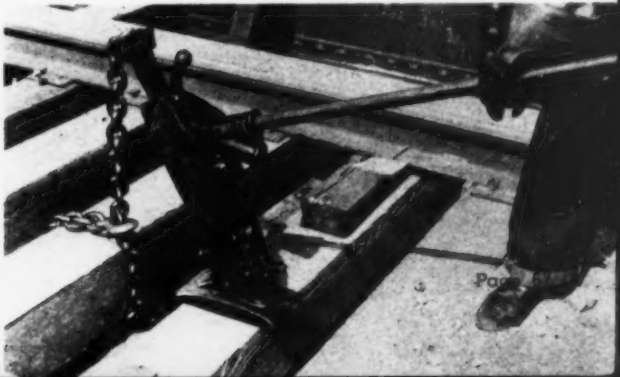


CLEANING OF CONSTRUCTION EQUIPMENT is done with Oakite steam-detergent gun, which quickly removes grease and dirt.

GLUE MACHINE (below) in pre-fabricating plant of Hayward Lumber Co., Los Angeles, applies Laucks casein glue to both sides of timber framing member. Panels are affixed to both sides of frame to make a stressed-cover unit.



TILTING BASE (below) is feature of this Simplex jack designed for bridge, viaduct and trestle work. Base is narrow, to fit between ties, and is notched for spiking or bolting. Dual-lever sockets make operating easy at any angle.





Small Tools



FOR CUTTING LUMBER on construction job worker uses Atkins hand saw. New handle design provides grip close to blade, making saw easier to use. Blade is of uniformly tempered steel to increase edge-holding qualities of teeth.



STEEL DECK PLATES at shipyard are bolted up with Ingersoll-Rand impact wrench powered by compressed air. Reversible unit weighing 29 lb. operates at 625 rpm. and produces 1,250 impacts per min. Suitable for nuts on bolts up to 1 1/4-in. size.



PULLING OF TRACTOR WHEELS, common operation in maintenance and repair of construction equipment, is accomplished readily with chain pull plate in combination with remotely operated 10-ton Blackhawk Porto-Power jack.



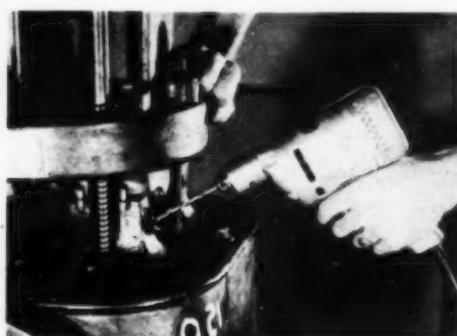
DAILY YARDAGE of average shoveler is increased by use of "deep-hang" blade on Razor-Back shovel designed to balance load. Center of tool made by Union Fork & Hoe Co. is forged thicker to permit drawing deeper bend.



CUT IN GAS MAIN is made with Thor-Nado electric hammer operated by workmen of Union Pacific Railway, in oil field at Long Beach, Calif.



CLEANING OF STEEL SURFACE preparatory to painting is done with this Aurand electrically operated tool.

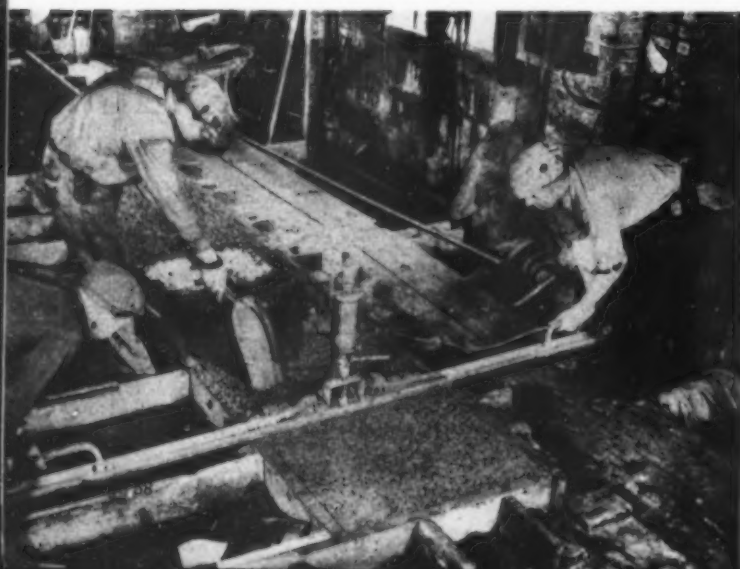


IN CLOSE QUARTERS, compact construction facilitates use of Mall 1/4-in. heavy-duty electric drill.

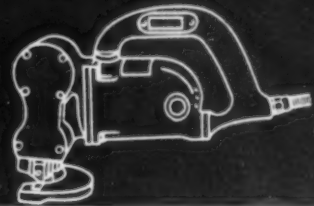
VIBRATING SCREED (below) for precast concrete slabs is produced by mounting Syntron electric hammer on channel iron.

GROUND ROD (below) is driven alongside pole by Barco gasoline hammer.

FOR DRILLING CROSS-ARMS (below) for high tension power line poles in Oregon, six Black & Decker 3/4-in. electric drills are mounted to operate simultaneously, finishing 70 complete cross-arms per hour.



on Construction



HIGHWAY REALIGNMENT in Mendocino County, Calif., necessitated removal of giant redwoods up to 7 ft. in diameter by California Division of Highways. Logs are cut by Hansen gasoline-powered saw



COMPOSITION MATERIALS, such as Celotex, Masonite, Transite and others, are readily cut with electrically-powered Skilsaw. This tool eliminates need for first drilling hole* and then cutting out with key-hole saw.



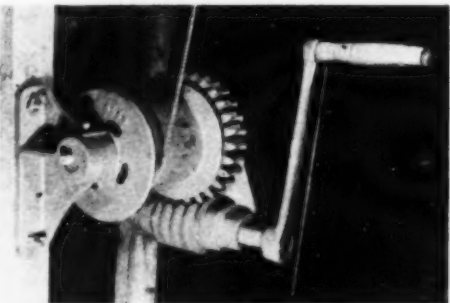
AUTOMATIC STAPLER is used to fasten to wood sash new type shatter-proof window pane of transparent plastic laminated with wire mesh. New material called Vuelite is made of cellulose acetate by Monsanto Chemical Co.



EXPANSION BOLT HOLES are drilled in brick masonry wall with Wodack electric hammer.



SHEET METAL for ventilating and heating ducts is cut by Stanley Unishear, replacing hand snips for fast cutting.



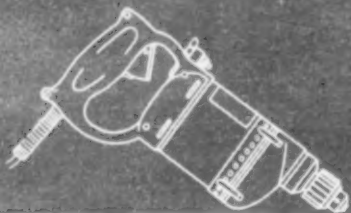
HAND WINCH (left) in five sizes, with capacities up to 2,000 lb. and 28:1 ratio, is equipped by Stephens-Adamson Co. with self-locking feature.

MAKING TRACTOR ADJUSTMENTS (below) and repairs, maintenance mechanic on 1,200,000-cu. yd. airport grading job of James D. Morrissey, Philadelphia, puts Snap-On socket wrench set and ratchet crank-handle attachment to good use.



STRENGTH OF PIPE WRENCH (below) for jobs where failure of materials would result in accidents to operator is assured by using, for Trimo tools, special heat-treated alloy of chrome molybdenum, manganese and nickel steels.





Small Tools



PORTABLE EARTH-BORING DRILL, designed for holes from 3 to 16 in. in diameter, has hardened steel cutting head below screw. Special cutting blade of Ka-Mo tool allows drill to bore in sand, mud or clay without grabbing. Flight conveyor brings excavated earth to surface.



TRACTOR TREADS are torn down and rebuilt with aid of Black & Decker electrically-powered nut runner.



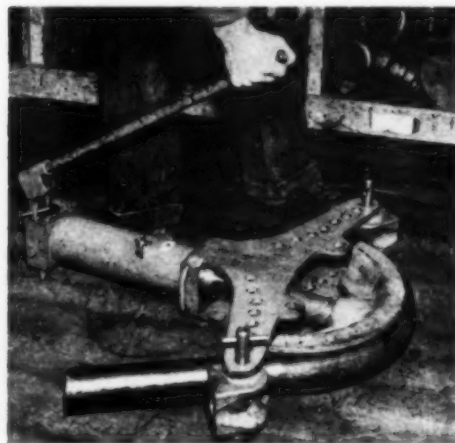
CLUTCH FACE for motor truck sent to shop for repairs is ground with a Dumore precision grinder operated by a 1/2-hp. induction motor.



CEMENT FLOOR FINISHER is powered by 2.3-hp. gasoline engine with automatic clutch. Whiteman unit has three 6x18-in. rotating trowels controlled by operator while machine is in motion by adjusting control handle. Heavy-duty blades, 10x18 in., for floating are interchangeable. Operating rate is claimed as 1,000 sq. ft. of floor in 15 min.



WOOD SHEET PILING at U. S. Naval Air Base is driven by Barco gasoline operated hammer.



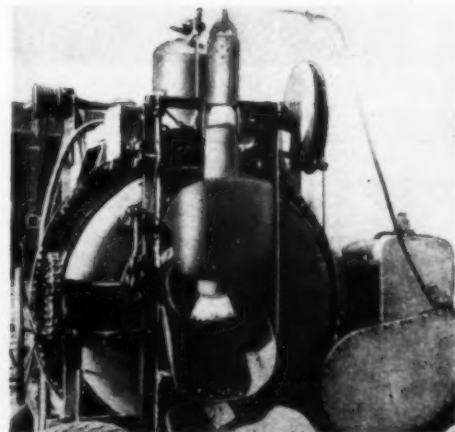
PIPE BENDS (below) are made with this device, equipped with forming heads actuated by hydraulic piston operated by pump handle at rear of assembly. Tal's Prestal bender has overall length of 32 in. and weighs 98 lb. with largest forming head. In addition to pipe and bar bending, unit can be applied to pressing or pushing operations.



CIRCULAR HOLES (below) are cut in large diameter precast concrete sewer pipe by Syntron electric hammer.

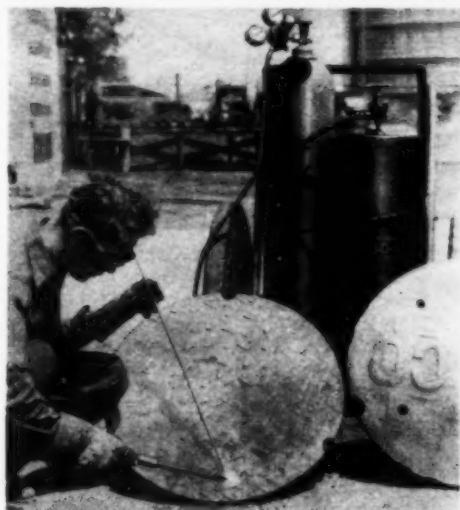
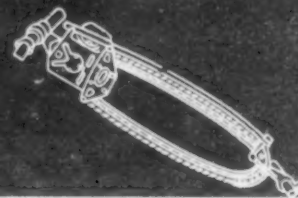


HOLES FOR POSTS AND POLES (below) are put down quickly by Buda-Hebron earth drill mounted on rear end of truck.



FOR COLD WEATHER CONCRETING Aeroil heater is mounted on concrete mixer to warm aggregate with kerosene flame.

on Construction



WORN LUGS ON CAST IRON MANHOLE COVER are built up with bronze welding rod and Linde oxyacetylene torch.



STEEL REINFORCEMENT for concrete slab in building is cut by powerful Porter bar cutter.



REVERSIBLE RATCHET feature on heavy Lowell bridge-builders wrench facilities use by steel erection crew.



DRIVING OF SHEETPIILING in gravel at rate of 4 ft. per min. is being done with this Chicago Pneumatic hammer. Use of tool, it is claimed, eliminates "brooming" common in hand driving.

WELDING OF STEEL PIPE (below) is accomplished with Airco oxyacetylene torch.



DENT IN BULLDOZER BLADE is taken out with aid of Simplex push-pull tool.



HEAVY MACHINE which has just moved into place is leveled with aid of Duff-Norton 25-ton heavy-duty jack.

TREE OF 40-IN. DIAMETER (below) is felled with Mall 2-cycle gasoline engine-driven chain saw, equipped with safety guard and positive lubricated saw guide. A saw-sharpening attachment can be furnished as optional equipment.



SERVICE

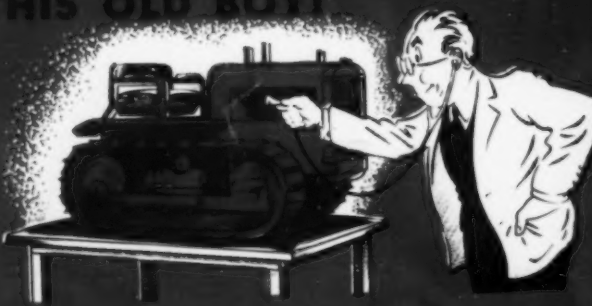


...as close as your phone

You awake on the morning of December 7, 1941, to the dawn of the biggest revolution in the dirt-moving industry. Jobs so big have since been awarded it has been necessary to pool equipment and resources to get 'em done on time. This may have taken you to new lands... far from your original camping grounds... far from your original Allis-Chalmers dealer. But it has not taken you away from Allis-Chalmers service. Wherever you are... you can get the same A-1 service to which you are accustomed. Spread over the U. S. A., in Alaska, Canada, in neutral and Allied Nations around the world are Allis-Chalmers dealers ready and anxious to keep your equipment rolling. They are as near as your 'phone—with a staff of factory-trained mechanics, whose skilled hands quickly adjust, repair or rebuild—no matter what the job might be... no matter the time of day or night. For your convenience, a booklet "Service At Your Door" has been prepared, showing where the continental Allis-Chalmers dealers are located and the territories they serve. Send for it... keep it... use it!

PLENTY OF LIFE LEFT IN THIS OLD BOY!

Have your Allis-Chalmers dealer look over some of the machines you've discarded because they appeared a bit obsolete. Chances are, he can put them back in operating shape — at least for limited or standby service. Every machine is needed to whip the Axis! The demand for roadbuilding equipment is 3 to 4 times the supply! If you have no use for your old outfit, your Allis-Chalmers dealer probably knows someone who does. Cooperate to help win the war!



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Know the territories of all
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dealers ... fully shown in
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Door." Send for it... NOW!



Small Tools



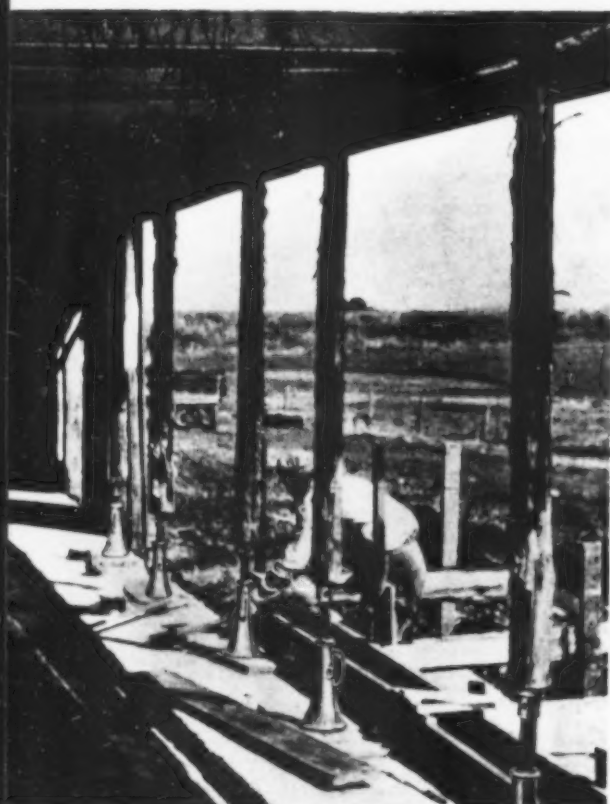
CONCRETE IN HEAVILY REINFORCED FLOOR SLAB is vibrated with Mall unit powered by portable gasoline engine.



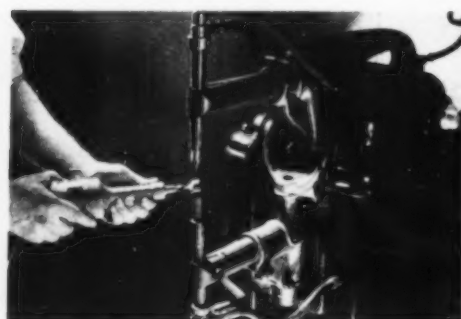
CONCRETE WITHIN FORMS is consolidated and distributed around reinforcement with aid of White vibrators powered by portable gasoline engines mounted on wheelbarrow chassis.



SPIKES FOR BRIDGE FLOOR construction on West Coast are driven rapidly by Thor pneumatic hammer in much less time than would be required by hand hammer driving.



RAISING OF SHED by Iowa contractor is done with aid of twenty Simplex screw-jacks to provide for laying of hollow tile wall.



BURNED END OF COPPER TIP on spot welding machine is cleaned and straightened up by abrasive band on Dumore hand grinder operating at 22,000 rpm.

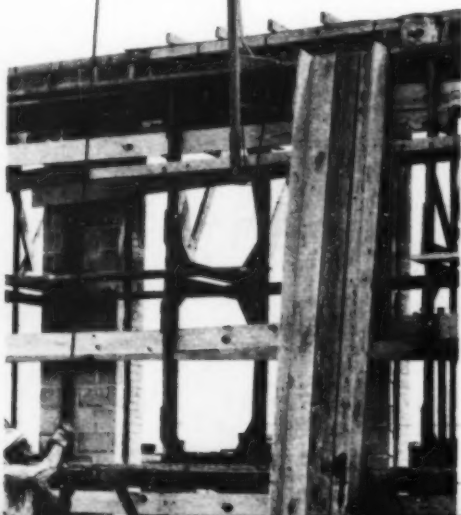
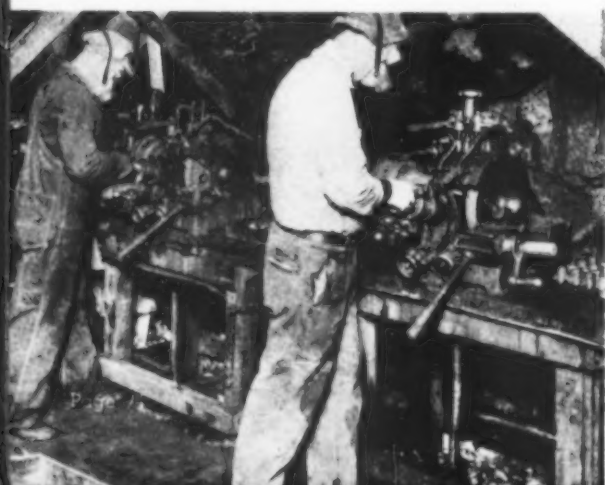


PIPE CLOSE TO WALL is threaded by Armstrong ratchet stock operating in close quarters. Also illustrated is 3-wheel pipe cutter which can be operated where there is room for only one-third rotation of handle.

ONE-MAN OPERATION (below) is a feature of this Clipper light-weight hoist equipped with automatic load release. Illustration shows hoist in use on building construction by Collins Construction Co., of Kansas City, Mo.



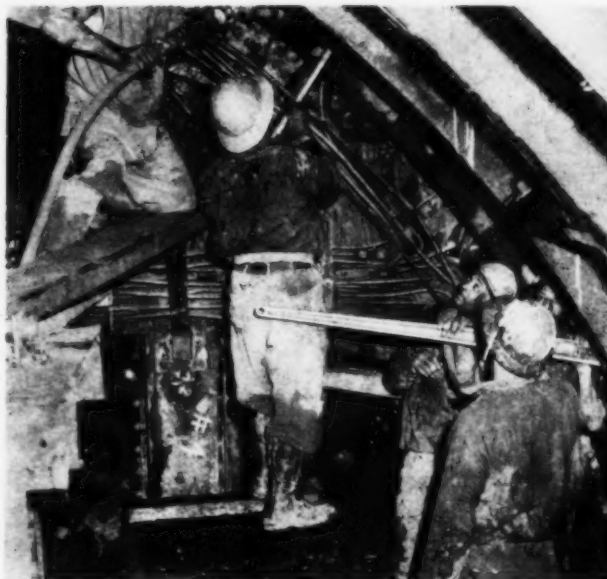
DETACHABLE DRILL BITS (below) are sharpened by Carborundum grinders in blacksmith shop of construction company using Ingersoll-Rand Jackbits.



MORTAR JOINTS (below) are grooved for tuck-pointing by Wodack electric wrangler. Tool is also applicable for scoring concrete floors and cutting slate and tile. Cutting is done with 8-in abrasive wheel.

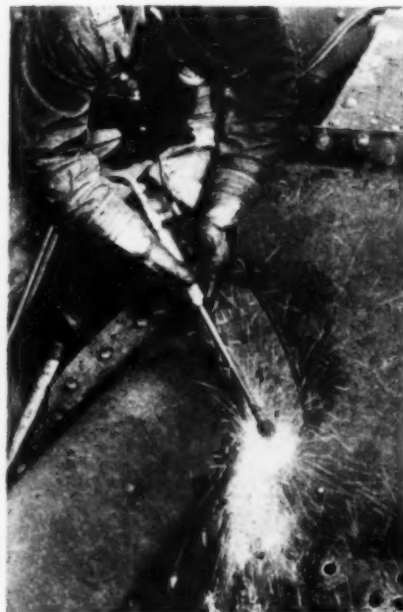


on Construction



TO TIGHTEN 1 1/4-in. BOLTS joining segments of cast-iron outer lining for twin 31-ft-diameter tubes of Battery vehicular tunnel under East River, New York City, Geo. H. Flinn Corp., contractor for \$14,000,000 section 2,400 ft. long at Brooklyn end, uses Ingersoll-Rand pneumatic impact wrench (**left**) to take up initial tension, followed by two tightenings with Lowell reversible ratchet wrench (**right**) to develop final bolt tension of 30,000 lb. per sq. in.

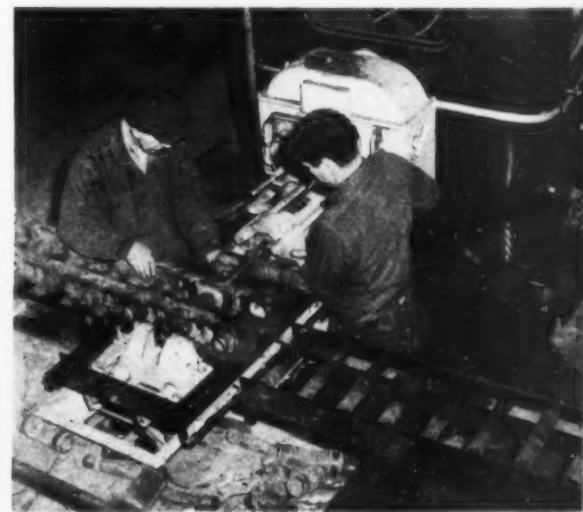
LUMBER FOR FORM WORK is ripped on C.H.&E. saw rig powered by 12-hp., 4-cylinder gasoline engine mounted on back of table and driving 20-in. circular saw through V-belt. Table top can be tilted 45 deg.



REMOVAL OF RIVETS from hopper car is accomplished with Oxyweld blowpipe and low-velocity rivet-cutting nozzle. Stream of low-velocity oxygen quickly oxidizes rivet head but does not affect adjacent plate.



LAG-SCREW DRIVERS of Black & Decker make are used by Norfolk & Western Railroad on heavy-duty rails.



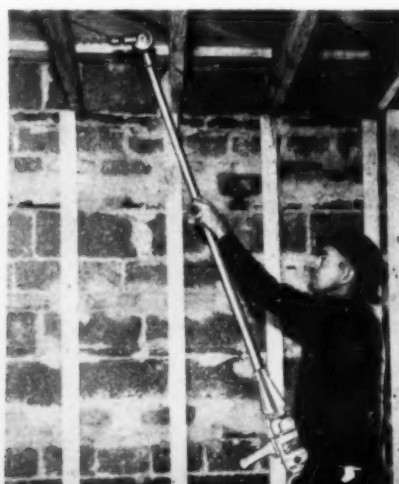
PORTABLE TRACK-PIN PRESS mounted on truck for easy mobility and driven by power take-off from truck transmission to oil pump of Rodgers hydraulic unit removes and replaces pins and bushings of crawler tracks for George M. Brewster & Son Co., contractor, Bogota, N. J.

HOLE-SAW ATTACHMENT (below) on Stanley electric drill makes openings in side-wall of house prior to application of insulation.

EQUIPPED WITH SPECIAL CHISELS (below) Syntron electric hammers cut mortar from joints in brick wall prior to waterproofing operations.

EXTENSION DRILL ATTACHMENT (below) on Skilsaw tool makes it possible to work overhead on joists or studs for electrical and plumbing installations.

REMOVAL OF WATER (below) from sumps and ditches is done with Chicago Pneumatic sump pump, operated by air compressor.





OSGOOD

is keeping pace with the needs of Contractors and Industry by developing excavating and materials handling machines to meet present day requirements.

OSGOOD AIR CONTROL

the smooth, velvety, effortless control force that brings the operating ease and efficiency of steam to this new OSGOOD Type 70 crane. OSGOOD Air Control is simple in operation, easy to maintain, and costs next to nothing. Even though our production schedule is full—now is a good time to check on OSGOOD Air Control.

The
GENERAL
EXCAVATOR CO.

Sizes: 1-12-15-20-30
DIESEL - GAS - ELECTRIC

Associated with
THE OSGOOD CO.

The
HERCULES
COMPANY

HERCULES
IRONEROLLERS
6 to 12 Tons
Diesel or Gasoline

Associated with
THE OSGOOD CO.

OSGOOD

Sizes:
1/2 to 2 1/2 Cu. Yd.
Diesel - Oil - Gas - Electric



SHOVELS
DRAGLINES - CRANES
Crawler & Wheel Mounted

THE OSGOOD COMPANY, Marion, Ohio

NEED MOTORS FOR WAR WORK?

4 Things
to do to
get them quicker

**YOUR AID ON THESE 4 POINTS
WILL HELP US PRODUCE AND
DELIVER MORE MOTORS**



Tri-Clad motors are available in a full range of sizes from 1 to 100 hp. Your General Electric representative can supply complete information and help you get the Tri-Clad motor to do your job. General Electric, Schenectady, N. Y.

Your choice of G-E Tri-Clad motors will give you extra protection against (1) physical damage, (2) electrical breakdown, (3) operating wear.



SPECIFY TRI CLAD MOTORS

GENERAL ELECTRIC

Use standard, open, sleeve-bearing motors whenever possible



The standard Tri-Clad motor, though classed as an "open" motor, is so well protected that it gives good service on many jobs where special motors often were recommended.

Sleeve-bearing motors often can be supplied more readily than ball-bearing types because of the present demand for ball bearings on other war equip-

ment. Use ball-bearing motors only where load or mounting conditions require them.

Special end shields and other modifications may result in delay for you and others.

Consider the use of standard or multispeed a-c motors in place of d-c motors wherever this alternative is possible

order motors early . . . giving complete specifications



Place motor orders when you order the machines they are to drive.

If you are planning motor drives for conveyors or other equipment for new plants, place the orders as soon as design

work indicates the motor requirements.

Avoid delay and mix-ups by giving complete specifications, preferably on an order form which your G-E motor representative can supply.

give complete priority information, properly endorsed



The filling of many motor orders is delayed because of incomplete priority information. If in doubt about details, call the nearest G-E office.

When placing orders for motors, be sure that complete priority data accompanies each order in the form of certificates, endorsements properly signed, etc. The priority is not effective in scheduling shipment until it is received by your supplier.

Your needs and the war effort are best served by using the proper priority rating assigned by the War Production Board for the job involved, and requesting delivery no earlier than actually required. Under the Production Requirements Plan, builders of motor-equipped machines for subsequent sale may order their requirements in advance.

check with G.E. for delivery from local warehouse stocks



To meet urgent war needs, a supply of standard Tri-Clad motors is maintained at G-E factories and local G-E warehouses. Perhaps the motor you want, or can use with a few

simple changes, is available for immediate shipment. Your local G-E motor representative can furnish information on motors which may be in stock in the following cities:

Atlanta, Ga.
Boston, Mass.
Buffalo, N. Y.
Charleston, W. Va.
Chicago, Ill.
Cincinnati, Ohio
Cleveland, Ohio
Dallas, Texas
Davenport, Iowa
Denver, Colo.
Detroit, Mich.
Houston, Texas
Kansas City, Mo.
Los Angeles, Calif.
Milwaukee, Wis.
Minneapolis, Minn.
New York, N. Y.

Oklahoma City, Okla.
Omaha, Neb.
Philadelphia, Pa.
Pittsburgh, Pa.
Portland, Ore.
St. Louis, Mo.
Salt Lake City, Utah
San Francisco, Calif.
Seattle, Wash.

CONSTRUCTION EQUIPMENT NEWS

Review of Construction Machinery and Materials
for OCTOBER, 1942



When **TIME**
Everything
Means **MONEY**
use
MONOTUBES

Four features to help you beat construction deadlines, produce foundations faster and at less cost:

- 1 QUICK Handling.** Monotube steel casings are light in weight for fast and economical handling.
- 2 FAST Driving.** Tapered Monotubes are strong and rigid, require no heavy core or mandrel, and can be driven with average job equipment.
- 3 SPEEDY Extension.** By using Extendible Monotubes you can install varying pile lengths without delay—even in low headroom.
- 4 EASY Inspection.** Tubular design permits quick, thorough inspection of the casing from top to toe before concreting.

Monotubes are supplied in gauges, tapers, and sizes to meet the most exacting requirements in any soil condition. Write for catalog.

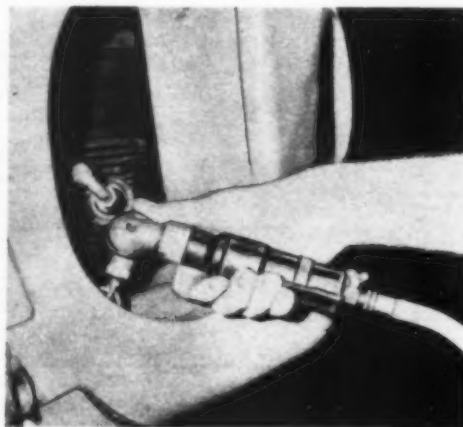
Remember—"More Production Means Axis Destruction!"

**The UNION METAL
MANUFACTURING CO.**
Canton, Ohio



CONCRETE CURING COMPOUND, known as Aquastatic, is claimed by its manufacturers to insure complete hydration, maximum strength, durability and surface density. Advantages listed: (1) Dries within 15 min. to form adherent, impermeable membrane that thoroughly seals surface; (2) curing operation for slab concrete completed within 35 min., approximately one-half time necessary to wait for sufficient set to apply burlap, cotton or similar retentive covering; (3) produces results in concrete similar to that obtainable with water curing by providing continued curing for extended periods whereas water curing is effective but for specified period; (4) minimizes and usually eliminates crazing or surface hairline checking; (5) increases not only compressive and flexural strength, but also because it is chemically inert (non-reactive) it produces surface having exceptional durability with maximum resistance to erosion and abrasion; (6) need not be removed when it is desired to apply waterproofing membranes, reflecting runway markers or camouflage. Applied either with spray or brush in single coat. Spreading rate per gal. should not exceed 200-250 sq. ft. of specific area of surface. — **Solvents & Plastics Co., 8032 Forsythe Blvd., St. Louis, Mo.**

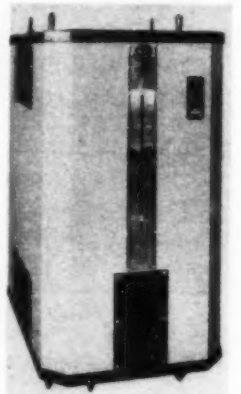
★ ★ ★



LIGHT ROTARY MULTIPLE-ANGLE DRILL features drilling head which can be set at any angle through 360 deg., permitting tool to fulfill function of several angle drills. Head swivels in two planes and may be turned to any position relative to location of throttle lever. Operator may bring fingers close to point of application, thus increasing accuracy in handling drill and insuring more speed in changing from one position to another. Weight 2½ lb. Length 8 in., when set for drilling in direction parallel to center line. Chuck is for ¼-in. drill. Speed of two models, 1,000 and 2,000 rpm. — **The Cleveland Pneumatic Tool Co., 3734 E. 78th St., Cleveland, Ohio.**

WELDING TRANSFORMERS, heavy-duty, a. c. models especially designed for Unionmelt welding, are available in 750- and 1,000-amp. sizes for 220, 440 and 550 v.

Features of line: (1) Built-in capacitors for improving voltage regulation of power feeders, thus aiding uniform welding; (2) built-in primary control not only simplifies wiring, but also is advantageous in portable installations because of its compactness. It includes disconnecting switch and auxiliary transformer to furnish power for operation of Unionmelt auxiliaries. Motor-operated, remote adjustment of welding current permits operator to make current adjustments without leaving work. Equipment's integral reactance design said to permit obtaining of full output without use of high or multiple open-circuit taps. Fan cooling claimed to conserve vital materials and space. Ample ventilation and arrangement of ducts permits two welders to be mounted side by side without need of extra space between them for ventilating air. Current output of each welding transformer is indicated by large, calibrated scale on front of case. Inorganic insulation is used throughout. — **General Electric Co., Schenectady, N. Y.**



The new Pomona Gaso-Fuel Pump...

Your solution to Aviation Refueling Problems!

Particularly Recommended for Transfer Pumping of Underground Storage at Airfields, Base Storage Points, etc.

THERE has long been vital need for a pump specifically designed to meet the unique requirements of gasoline and fuel oil transfer pumping, airfield refueling systems, etc. After extensive research and development, Pomona engineers have perfected such a pump, the Pomona Vertical Gaso-Fuel Pump! This pump overcomes the many drawbacks of conventional-type units in gaso-fuel service and has been particularly engineered to insure safe handling of volatile liquids under hazardous conditions. A few of its unique features include...

Explosion-Proof Motor: Discharge heads designed for operation with totally enclosed explosion-proof motors, any size—2 to 75 h.p.!

Extremely Compact: Pump is of space-saving vertical construction. Even largest size requires only 25" diameter of floor space. Easily fitted to existing piping arrangements!

Self-Priming: The pump impellers are below fluid level and begin pumping the instant motor starts. No priming required... an important safety feature!

Handles 100 Octane: Unlike closed impeller pumps, Pomona's semi-open impellers eliminate the hazard of vapor locking on highly volatile fluids, aviation gasolines and similar fuels.

No Fuel Contamination: All bearings in fluid stream are lubricated by the fluid being pumped. No oil or grease chambers to leak... no risk of contaminating fuel supplies!

Vapor-Tight Packing Gland: There is only one packing gland in this pump (contrasted with the two or more needed in other-type pumps) and it is specially designed to handle volatile liquids without leakage.

Minimum Turbulence: Fluid flow through the pump is unusually smooth with minimum friction and turbulence. Eliminates pockets and traps where "gas lock" can occur... prevents volatilizing fuel!

THESE ARE ONLY A FEW of the many outstanding features incorporated in the new Pomona Gaso-Fuel Pump. Write our engineering department for assistance on adapting this pump to your particular fuel handling operations... whether for gasoline or oil, large gallage or small, new construction or "work-over" operations!



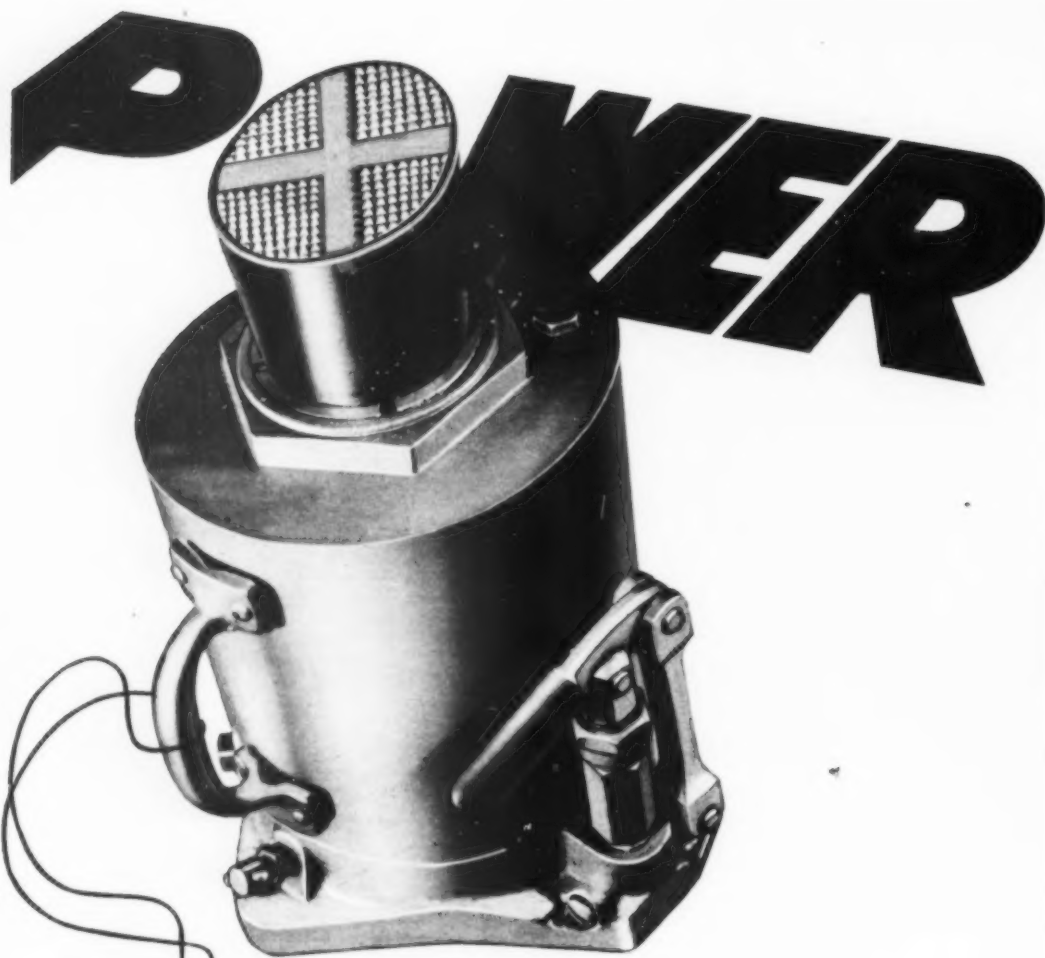
THE POMONA GASO-FUEL PUMP brings a new standard of efficiency to the handling of gasolines, benzines, diesel fuels, oils and similar fluids stored in airbase or other refueling systems • It can be mounted directly on the top of sub-surface storage tanks or in other convenient locations for use in transferring fluids to various dispersal units, pumping to loading tanks, etc. • All flanges and mountings are drilled to fit standard openings in storage reservoirs now in common use, enabling the pump to be quickly installed in existing distribution systems without piping alterations... or to be installed in new construction without costly, time-wasting special designs • Intake can be set close to the bottom for quick clean-up of sumps, tanks or compartments, and guards are available to prevent picking up bottom sediment or water • Pump can be easily adjusted at the surface to fit varying capacities and head conditions, giving wide flexibility to fit the particular operating requirements of each installation.

Get the full story on this new Pomona Gaso-Fuel Pump. Find out how it increases the safety and efficiency of refueling systems... how it incorporates unique operating features available in no other make or type of pump available today! See your nearby Pomona dealer for complete details—or write direct to our engineering department!

POMONA
Water-Lubricated
PUMPS

POMONA PUMP CO., 120 Broadway, New York City
Plants located at 4301 South Spring Avenue, St. Louis,
Missouri, and 206 Commercial Street, Pomona, California

A PRODUCT OF THE WORLD'S LEADING TURBINE PUMP MANUFACTURER



This seal is found ONLY on Blackhawk Jacks — your assurance of a wise and safe investment.

CONSTRUCTION engineers, foremen and maintenance men, should know how MODERN Blackhawk HYDRAULIC JACKS lick emergency and everyday construction problems. Perfected by Blackhawk in peacetime — these rugged brutes, with their efficiency, light weight, compactness and one-man operation, are today doing amazing wartime jobs. They can save man-hours, speed construction and maintenance and salvage materials for YOU. Write for literature or see your Blackhawk Distributor.

A Product of

BLACKHAWK MFG. COMPANY

Dept. J23102

MILWAUKEE, WISCONSIN

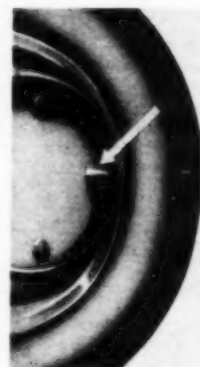


PORTABLE WATER PURIFIER, self-contained unit that uses no chlorine or other chemical, known as Sterozone Model B, and light enough to be dropped by parachute in remote areas, is claimed to sterilize water, killing all bacteria, to control taste and odor and to reduce color. Advantages listed by manufacturer: complete water purification without use of chlorine or other chemicals now on restricted list; automatic operation that does not require supervision by highly trained technicians; low-cost operation. — **Technicraft Engineering Co.**, 5610 South Soto St., Los Angeles, Calif.

★ ★ ★

ASBESTOS SAFETY BLASTING PLUG provides those engaged in demolition work with what is said to be cheap economical and efficient sealing device for drill holes to replace conventional sand or earth bag stemming ordinarily used in blasting or mining operations. Device consists of tapered wedge which is driven into asbestos cup with loading pole producing expansion of cup, filling drill hole and sealing it airtight directly above powder charge. In this way charge is properly confined and drill hole is sealed with one plug only. Methods of use: Charge drill hole, push plug unit into hole until it rests against powder, and strike several times with loading pole. Expansion of plug then takes place, sealing hole. Fuse or exploder leg wires embed themselves in folds of cup safe from breakage or damage of any sort. In case of misfired hole, insert another primer into drill hole and reseat with another plug. These plugs said to be particularly adapted to difficult blasting and may be used in drill holes of any direction. In overhead shots in pitch and raise work, plug provides means of retaining powder without difficulty. Plugs are light in weight, are not bulky or cumbersome and, since they are made of asbestos, cannot burn, smoke, create either gas or smoke or add anything detrimental to atmosphere of work surroundings. Cost of plugs claimed to be less than expense of preparing sand or earth bags; also to be easier to handle, with considerably less waste and labor. — **Heitzman Safety Blasting Plug Corp.**, Shamokin, Pa.

★ ★ ★



TIRE LOCK, called "Lok-On-Nut," for use in preventing theft has no key, no tumbler, no pins and no fragile parts. It is made of tough, hardened steel and is shaped to prevent being gripped by tool. Installed merely by replacing one lug nut or bolt with "Lok-On." Man possessing cap part of lock is only one who can take nut off. — **Streeter-Amet Co.**, 4101 Ravenswood Ave., Chicago, Ill.

ON GUARD FOR THE DURATION

★ Your HEIL serviceman
helps keep your dirt-moving
equipment operating efficiently



With Heil Quality-built Equipment you have a head start in "performance insurance". Every feature of Heil products is designed to provide outstanding service and life. Constant improvements are being made, even today, to prolong the already famed ability of Heil equipment "to take it and ask for more".

We don't have to remind you that such small items of care as greasing your sheaves and other moving parts regularly . . . watching your cutting blade, and reversing or replacing it before the bottom of the bowl starts to wear . . . using a good quality cable . . . watching your hydraulic equipment closely for tell-tale leaks that indicate a worn fitting . . . checking the rod wipers frequently . . . paying special attention to the hoses . . . noting worn parts and reinforcing or ordering replacement parts in advance to

save costly tie-ups later . . . taking advantage of the facilities of your nearest Heil distributor . . . all pay extra dividends in prolonged performance and operating efficiency.

Preventive maintenance is a sound investment, paying you back in "extra hour performance". See your Heil distributor for prompt service and genuine repair parts—he's "on guard for the duration" to protect your investment in Heil Quality-built equipment.

See him, too, on equipment to be mounted on used tractors or trucks . . . or completely new units (provided you have the necessary releases). You'll find your Heil distributor anxious to be of assistance to you—take advantage of his facilities soon.

THE HEIL co.

GENERAL OFFICES • MILWAUKEE, WISCONSIN



CONSTRUCTION

Treated Lumber Speeds Wartime Building

**DU PONT "CZC" PRESERVATIVE GIVES LUMBER QUALITIES
WHICH EARN PERMANENT PLACE IN CONSTRUCTION METHODS**

Use of lumber and structural timber treated with Du Pont "CZC"* for war-production plants, hangars, armories, warehouses, bridges and other essential wartime construction is releasing important quantities of structural metals for other war needs. At the same time this use of "CZC"-treated timber is enabling builders to complete these urgently needed structures on time, or, ahead of schedule.

A distinctive structural material
In addition to meeting the emer-

gency created by the metal shortage, "CZC"-treated timber in wartime construction is demonstrating outstanding advantages of its own. These stamp it as a distinctive structural material with a wide range of applications for both emergency and permanent peacetime construction.

Of primary importance, of course, is the excellent protection given against decay and termites, enabling treated timber to outlast untreated wood from 3 to 10 times, depending on con-

ditions encountered. At the same time it retains all the fabrication advantages of wood and leaves lumber clean, odorless, paintable, safe to handle and with a definite, measurable fire resistance.

Lower cost—faster fabrication

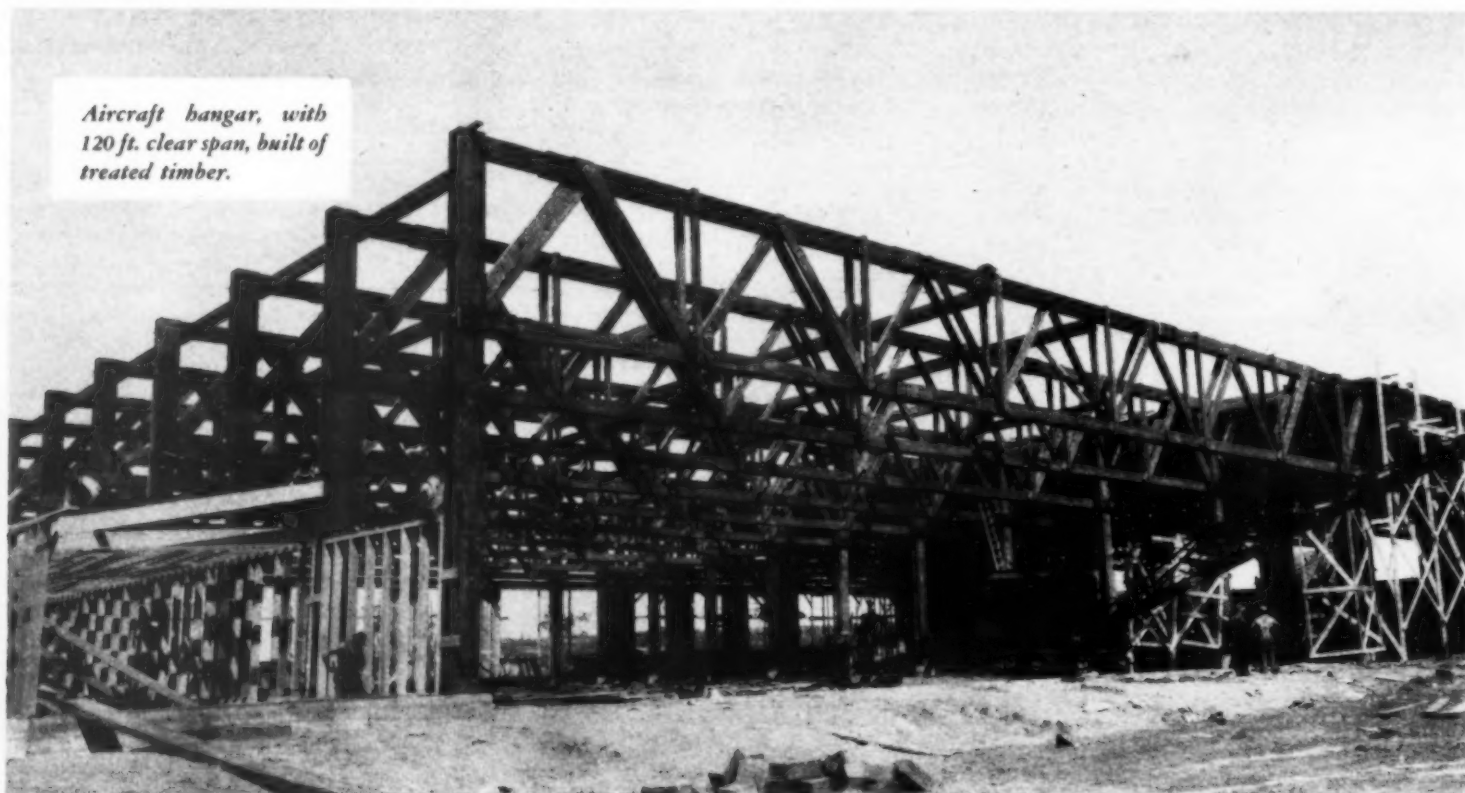
Another major advantage of "CZC"-treated wood as a durable structural material is its economy. Lower in first cost than metal, it also frequently makes possible savings in transporta-

tion and in fabrication time. Sometimes, too, its use permits fabrication by more readily available skilled men.

A recognized Government standard

Du Pont "CZC" treatment is a recognized U. S. Government standard covered by Master Federal Specification No. TT-W-571B. For full details write E. I. du Pont de Nemours & Co. (Inc.), Grasselli Chemicals Department, Wilmington, Delaware.

*Chromated Zinc Chloride



*Aircraft hangar, with
120 ft. clear span, built of
treated timber.*

Information for contractors
about Du Pont Explosives,
"Ventube" and "CZC"

CARE AND HANDLING OF "VENTUBE"

No matter how good a product is, its life can be seriously shortened by neglect or improper care. "Ventube" is no exception to this rule. That's why it pays to handle "Ventube" carefully . . . keep a supply on hand of du Pont's special patching cement and cloth . . . and always observe correct storage methods. Complete details are contained in the new "Ventube" handbook.



DID YOU KNOW?

. . . THAT waste kitchen fats are needed *now* to help supply the glycerine required for manufacturing dynamite . . . THAT you can help your country and your industry by urging housewives to save fats and sell them to their local butcher.

. . . THAT "CZC", in addition to being a wood preservative, makes wood fire resisting. Usual treatment makes timber hard to ignite, while slightly higher retentions give a high degree of fire resistance.

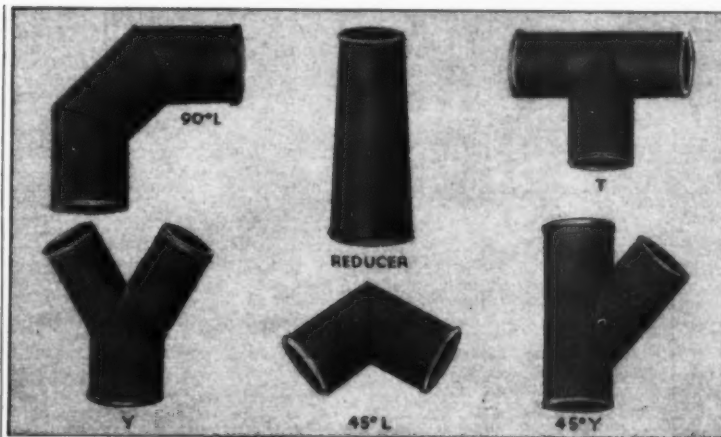
. . . THAT "Ventube" was carried into the high Andes by airplane for use in copper mines in Chile.

"Ventube"* fittings aid conservation program

Today, air can be handled just as easily and efficiently as water is handled through a hose. "Ventube," together with Y, L, T and reducer fittings, has made tunnel driving vastly easier than before.

These same advantages of "Ventube" in times of peace have special importance today when conservation is a national need. The same "Ventube" which was used yesterday in a water supply tunnel can be used today, perhaps with different fittings, in the construction of a railway tunnel. No matter how narrow the entry, or how unusual the working conditions, "Ventube" can maintain excellent air conditions at all times.

This versatility of "Ventube" is a big help to contractors in enabling them to get the most out of their ventilation equipment. Because "Ventube" is the result of years of du Pont re-



Types of flexible fittings supplied with Du Pont "Ventube."

search to develop the most efficient type of fabric and the toughest impregnating and coating compounds "Ventube" resists heat, moisture, mildew and decay, acids, alkalis and gases.

Proper care and handling of "Ventube" will enable you to use and re-use it many times with

excellent results. For further information, send for your copy of the new "Ventube" handbook. Write E. I. du Pont de Nemours and Co. (Inc.), "Fabrikoid" Division, Fairfield, Conn.

*"Ventube" is Du Pont's registered trade mark for its rubber-impregnated flexible ventilating duct.

Equipment Life Prolonged By Using More Explosives

A du Pont representative with many contacts in the field, passes on this tip for conserving equipment. He writes:

"In talking with various contractors the last several months I find many of them inclined to use a little more explosives on their work, rather than try to rip and dig material which should have been

shot. This is in line with their present practice to do everything possible to conserve their equipment which in many cases cannot be replaced."

This suggestion does not advocate wasteful use of explosives. It simply points out that right now it doesn't pay to be "penny wise and pound foolish" in using

them. A bit more explosive is less expensive and far more available than shovel teeth, truck bodies and other replacement parts.

Your du Pont representative will gladly advise on the correct quantity and type of explosives to use, and on *all* other factors involved in making blasting meet today's requirements.

★ E. I. DU PONT DE NEMOURS & COMPANY (INC.), WILMINGTON, DELAWARE ★

They're

Coming in . . .

Lights Up!

Roaring planes returning to outlying and secret air bases far from electric power lines — inky blackness below. Then compact, portable units, powered with flash-starting Briggs & Stratton gasoline motors, swing into action and floodlights gleam. Ample light for a safe landing and for speedy service. This is but one of scores of jobs that more than a million and a half Briggs & Stratton motors are doing daily — with our armed forces everywhere, as well as on farms, in homes and for industry.

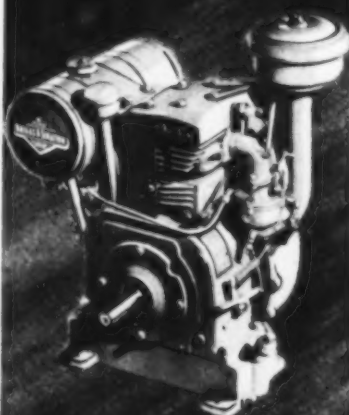


For the duration, in ever increasing quantities, Briggs & Stratton

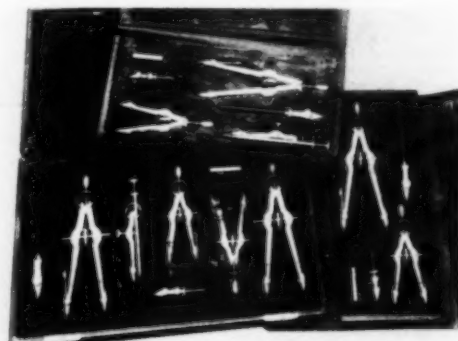
4-cycle, air-cooled motors are being produced only for war and approved civilian uses.

To assist in the conservation of critical materials, owners and operators of Briggs & Stratton motors are urged to give them more frequent inspection and care than normal, to avoid unnecessary need for repair parts. If additional service or parts are needed, go to your nearest dealer or an Authorized Service Station.

BRIGGS & STRATTON CORP.
Milwaukee Wis., U. S. A.



AMERICAN MADE DRAWING INSTRUMENTS. available in three combinations of bows, drop bows and pens and marketed under name of Vemco, are said to embody unusual features of open truss design which increases strength and rigidity while cutting weight 40 percent. This rigidity combined with absolute concentricity, it



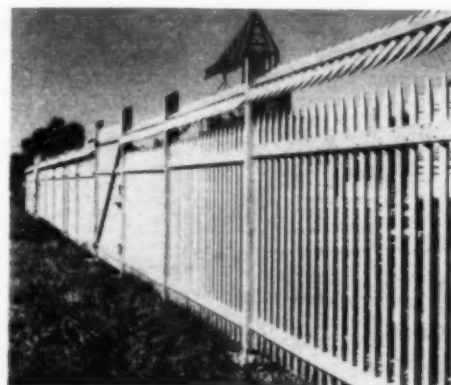
is said, enables user to describe extra large, dense circles in pencil without any yielding on part of instrument. Each bow has centerscrew adjustment which articulates with legs by cylindrical nuts. Legs bear upon double-grooved hinge pin of broad base, said to assure strength and perfect alignment. Construction is of steel, satin-chrome plated. Sets are available in one, two and three bow combinations complete with dividers and pens. Packed in leather cases.—V.E. Engineering Co., Pasadena, Calif.

★ ★ ★

BLACKOUT BLINDS of heavy crepe fiber, already installed in many coastal plants and government buildings, are of cord type which are said to raise and lower easily and by practical method of overlapping, to be adaptable for windows of any size or number in factories, hospitals and public buildings. Blinds are claimed to be light-proof and flame-proof and not to crack or peel. Side panels are available for installation at end of series of windows, at corners, posts or other obstructions to insure complete light seal. Same crepe fiber material is available for outside installation on skylights and for effectively blacking out saw-tooth buildings without usual reflections said to be obtained by most methods.—Clopay, 1207 Clopay Sq., Cincinnati, Ohio.

★ ★ ★

NON-CLIMBABLE WOOD FENCE made of Douglas fir in 6-, 7- and 8-ft. heights may be procured for use in protecting ordnance plants, air fields, shipyards and industrial properties. Shipped knocked down in carload quantities only with all parts or members said to be accurately machined for easy assembly. In each 10-ft. section there are 21 point-



ed pickets 2x2 in. by 6 ft. held between 2x4-in. rails at top and bottom. Rails are notched to one-half thickness of pickets so that two faces of rails meet. Ends of rails are supported in notches which are cut into pair of mortised strips, or cleats, fastened to wide sides of posts. This method of fabrication leaves post intact and promotes economical rapid erection. Guard rail is composed of 20-in. pickets pointed at both ends and set at 45-deg. angle. — Weyerhaeuser Sales Co., First National Bank Bldg., St. Paul, Minn.

MACMILLAN PIONEERS AGAIN!



New
1-Quart Container
Without Metal for
**RING-FREE
MOTOR OIL!**

NON-REFILLABLE

HERE IT IS! The quart container for motor oil which motorists and dealers have been expecting!

And it's Macmillan who pioneers again! A "can" without metal for RING-FREE!

With the steel mills converted to war purposes, the supply of metal cans for oil has dwindled and virtually disappeared. That was natural and right.

But motorists, wanting to be sure of getting RING-FREE—in its own quickly identified quart containers—have been hoping that this difficult packaging problem would be solved.

Now the new quart is ready! Now every independent dealer selling RING-FREE can open this new container and put in the fill of RING-FREE every car has been thirsting to get!

Among other things, Macmillan pioneered with RING-FREE motor oil ten years ago. There never has

been an oil like it. There can't be, because it's refined by an exclusive, patented process.

That's why it removes carbon, saves as high as 10 per cent on gas, reduces friction fast, saves wear and repairs and lengthens the life of your car.

Now Macmillan pioneers again—after months of search and research—bringing out a metal-less container to assure motorists of getting RING-FREE!

The Macmillan sign is shown at independent filling stations, garages, and car dealers. Drive in and get your fill of RING-FREE today!



MACMILLAN PETROLEUM CORPORATION

50 West 50th Street, New York
624 South Michigan Avenue, Chicago • 530 W. 6th Street, Los Angeles

Copyright 1942 by
Macmillan Petroleum Corp.

35c
A QUART IN U. S. A.

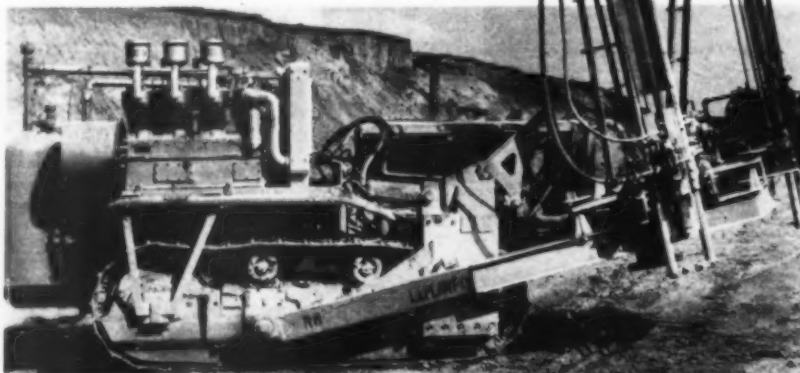
Adapted to the job...

DAVEY AIR COMPRESSORS

★ Here is an interesting example of Davey versatility and skillfully engineered construction. A model 420, consisting of two model 210 Davey Compressor Units, is mounted on an RD -8 Caterpillar Chassis to provide power for the two Cleveland DR-8 Wagon Drills also attached to the tractor. For tough jobs like this requiring trouble free air service over long periods use Davey Compressors—the only air compressors with guaranteed lifetime values.

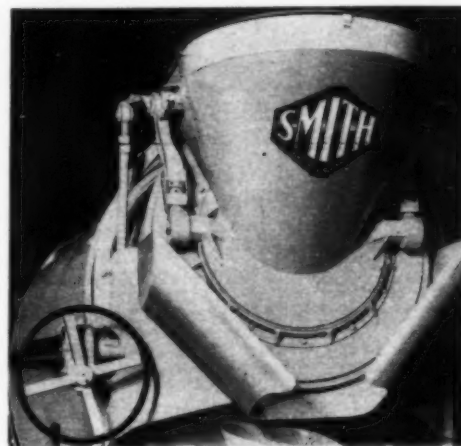
Davey Track-Air Compressors are furnished in five models — 105-160-210-315 and 420 for application on Allis-Chalmers, Caterpillar, Cletrac and International Tractors. The unique mounting makes the compressor a part of the tractor—free from vibration. Complete detailed information available upon request.

Davey also builds a full line of heavy duty portable and industrial compressors.



DAVEY COMPRESSOR COMPANY
KENT · OHIO · U.S.A.

COMBINATION SELF-ALIGNING FEED CHUTE and closing door support is now available for use with Smith-Mobile truck mixers and agitators, eliminating need for manual adjustment and assuring smoother operation. Uniform contact be-



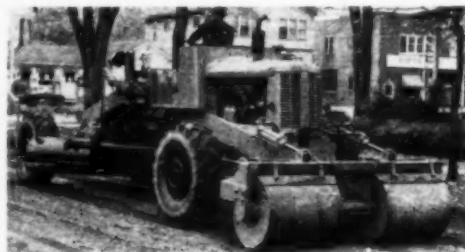
tween revolving sealing ring and mixer drum is established throughout entire 360-deg. surface, thereby compensating for whatever misalignment results from weave in truck chassis. New design also includes self-cleaning feature. Manufacturer claims that grout which might work past seal cannot possibly get into bearing surface in which sealing ring rotates.—**T. L. Smith Co., Milwaukee, Wis.**

★ ★ ★

SAFETY CLOTH made of 10-mesh cotton with tough, transparent plastic film is designed to provide (1) either permanent or emergency "flexible" window for buildings of any kind without use of priority metals and materials and (2) to be used as protection upon inside of glass windows, to reduce danger to persons or property should window be shattered by bombing or other shocks. Available in 100-yd. rolls 28 in. wide, totalling 702 sq.ft. Advantages claimed: (1) Does not shatter; (2) admits light; (3) resists weather; (4) easily installed; (5) affords low cost protection.—**Colloid Equipment Co., Inc., 50 Church St., New York, N. Y.**

★ ★ ★

ROLLER ATTACHMENT for 99-M power grader is recommended by its makers for patching or consolidating shoulders, stabilizing soil, resurfacing and similar operations where weight, power and maneuverability of such a grader are needed to handle such work satisfactorily. Combination is claimed to work well even when rolls are forced down for maximum compression because every "99-M" wheel is steered and driven by power, giving operator full and abso-



lute control of machine at all times. Rolls are of hollow welded steel construction with dished ends for greater strength and are mounted in rigid, ship-channel steel supporting frame which pivots from rear bumper. Hand lever on dash controls raising and lowering of rolls by hydraulic power. Hydraulic rams have shimmed ball-and-socket connection at both ends. Rolls measure 2½ ft. in diameter by 3 ft. wide, are spaced 2 ft. apart and are positioned to track behind wheels and smooth out tire marks. Rolls, each equipped with two bronze bushings and two spring tension scrapers, are mounted on non-rotating axle. Roller attachment is said to be easily attached and removed and in raised position does not interfere with grading operations. Cocoa mats which can be saturated with kerosene are available for oil-mix work.—**Austin-Western Road Machinery Co., Aurora, Ill.**

IN THE SPOTLIGHT



Exclusive Features of "Ames" Solid Shank Shovels

- 1 The blade and socket made from one solid piece of steel.
- 2 The Shock Band which adds substantially to the handle strength.
- 3 All grades heat treated.
- 4 Labels die pressed into wood in two colors.
- 5 D Handle shovel equipped with the famous ABW Armor-D Handle.

Add to these features the quality of the steel and the second growth Northern Ash handles and you have a shovel that is *tough!*

Ask your Jobber

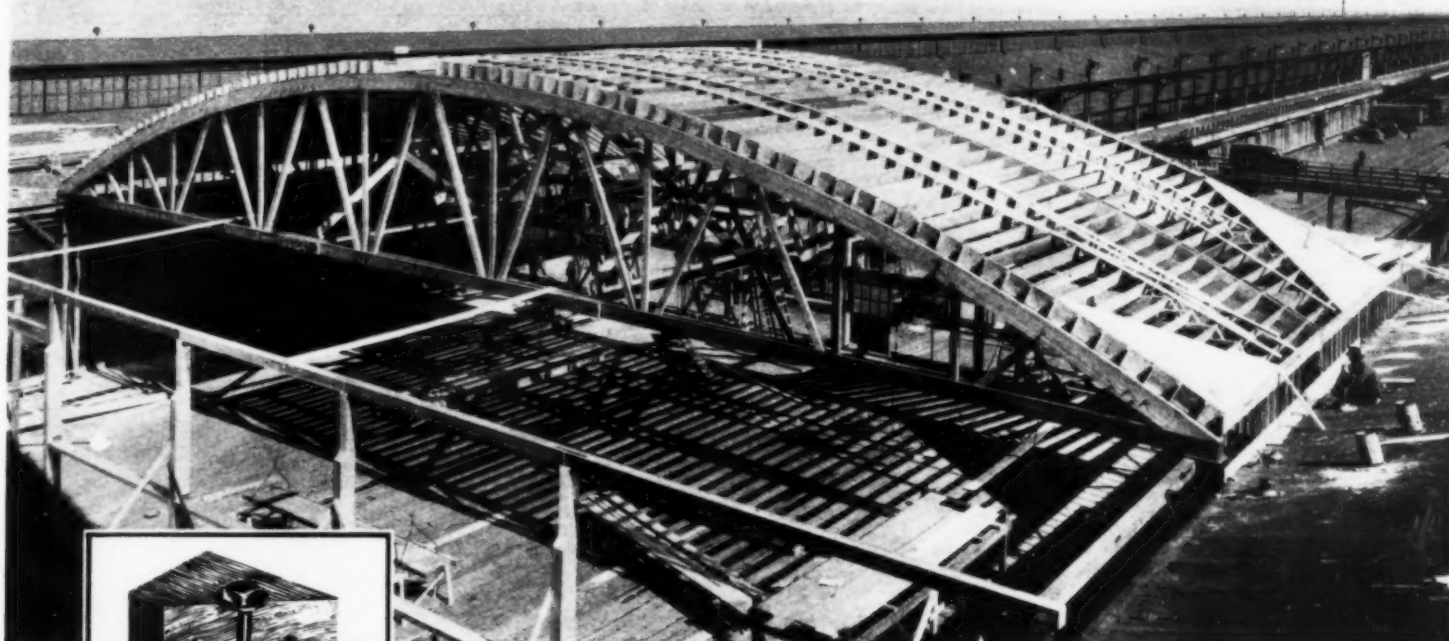
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SCOOPS · FORKS
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TECO Ring Connectors spread the load on a timber joint over practically the entire cross-section of the wood.

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Spanning 111 feet, these timber trusses are typical of many thousands . . . short span and long span . . . now being prefabricated with TECO Connectors.

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It endows the joints with great strength while reducing, at the same time, the size of members used. It eliminates most of the bolts, plates and angles formerly used in heavy construction. It builds factories, hangars, bridges, warehouses, docks, and derricks in less time, with less labor, and at less cost.

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Timber

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EVERY MAN
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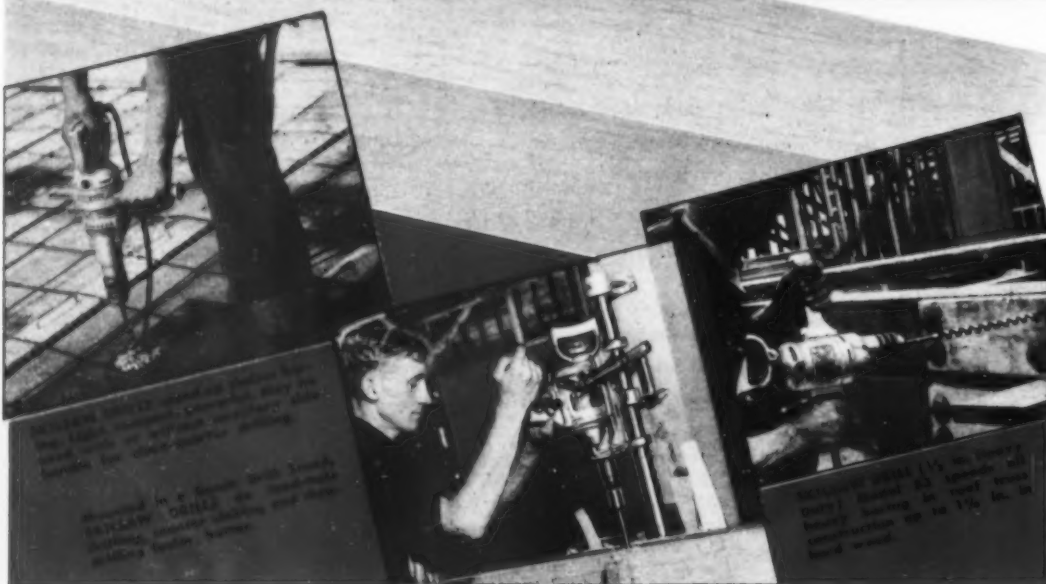


• When you think how many holes must be drilled on a single big project, you'll realize how important SKILSAW DRILLS can be to you in rushing war construction. The seconds they save on each operation mount up to days saved on whole contracts . . . days that will help bring Victory sooner!

SKILSAW DRILLS are faster because they are more powerful. They're lighter, more compact and easier to handle on all drilling from lightest lead holes for screws to heaviest reaming. 23 POWERFUL MODELS. Ask your distributor for a demonstration of SKILSAW DRILLS on your own work.

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SKILSAW PORTABLE ELECTRIC **TOOLS**
★ MAKE AMERICA'S HANDS MORE PRODUCTIVE ★



LOW PRESSURE WELDING GUN for use in welding brackets or clips to light-gage alloy steel where light pressure is needed in order not to deform metal, operates by hydraulic pressure with partially counterbalancing air pressure, latter serving to retract automatically points where operating pressure is released, thereby simplify-

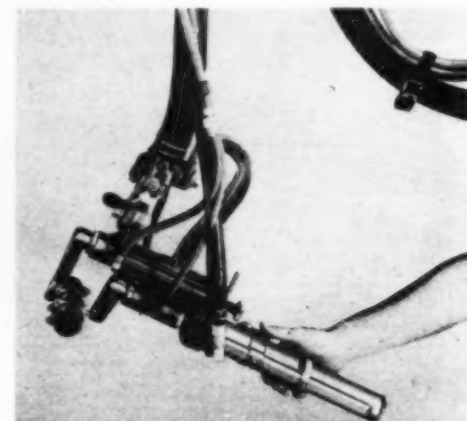


Fig. 1 **WELDING GUN** designed for spot welding of light-gage alloy steels where low pressure is required in order not to deform work.

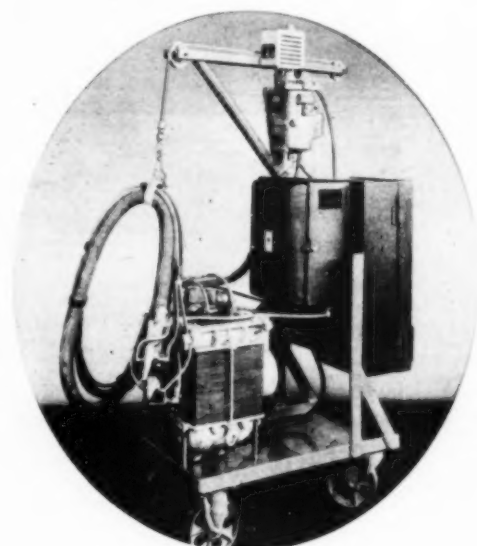
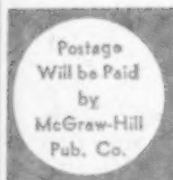


Fig. 2 **LOW PRESSURE WELDING GUN** is available as portable unit complete with transformer and controls.

ing operation. Features include screw adjustable stroke (up to 3 in.) to take care of wide range of work sizes and quick interchangeable adapters for electrodes to make gun suitable for wide variety of work shapes. Concentric, kickless and highly flexible welding cables and electronic controls are used in complete assembly. — **Progressive Welder Co., 3050 E. Outer Drive, Detroit, Mich.**

★ ★ ★

FOR WATERPROOFING MASONRY there is now available chemical powder called Drye which is claimed not only to be effective for use on brick, stone or stucco, but for repair of cracks in concrete and iron. Product is said to waterproof basements, walls before plaster is applied and leaks in mortar joints and cisterns. May also be used for hardening and waterproofing cement and mortar when included in mix and is suitable for patching cement and bonding tile to cement. Mixed with cold water, it forms paste which may be brushed or troweled on walls or other surfaces. One application for outside work; two for inside operations. Coverage said to be approximately 10 sq. ft. per lb. Cost estimated at 2c. per sq. ft. If colorless waterproofing is desired, companion product, Liqui-Drye is recommended as scarcely visible where applied and designed especially for porous types of masonry, such as stucco. Two applications are required. — **Weather Seal Co., 12 E. Pearl St., Cincinnati, Ohio.**



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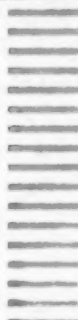
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— on Koehring Trail-Dump absorbs road shocks, allows free movement of body for high speed travel over rough haul roads. Trail-Dump can climb 21" furrows without frame distortion. Free, universal action at upper end of hitch yoke allows wagon and tongue to move in any direction without body twisting strains. These important advantages permit high speed travel without penalty of twisting strains, excessive repair costs. High speed travel increases loads per hour, yardage per hour.

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Koehring Trail-Dump has oscillating steering axle, free universal action at top of hitch yoke . . . for high speed travel over rough haul roads.



HEAVY-DUTY CONSTRUCTION EQUIPMENT

RITECURE

[THE ORIGINAL COLORLESS MEMBRANE]

FOR AIRPORT CONSTRUCTION

In Curing Concrete it's the Film that Counts

It's the RITECURE Film with 60% solids, that Counts Most

RITECURE was the film-forming curing agent used on such important concrete surfaces as the Tri-borough and Bronx-Whitestone Bridges. Censorship prohibits publication of the numerous airports, access roads, military highways and government buildings in every part of the country on which RITECURE was the standard curing medium.

Yes, RITECURE has a long record . . . a record of helping contractors to produce better concrete structures economically. It is the ideal curing material for airport construction where speed is essential. It reacts with the calcium radical in the concrete, not only to form the impervious, semi-clastic, moisture-sealing membrane

but to hard-surface the concrete. RITECURE increases the abrasion resistance and durability of concrete surfaces.

RITECURE is economical to use and easy to apply. One gallon will cover from 30 to 40 square yards with tough, lasting, impervious membrane which effectively seals in the moisture during the entire critical curing period. By test, it shows 97.4% water retention for 24 hours, 96.2% for 72 hours, and 92.4% for 168 hours. It's the 60% solids that count.

- RITECURE is furnished with a temporary color indicator to aid application and inspection.

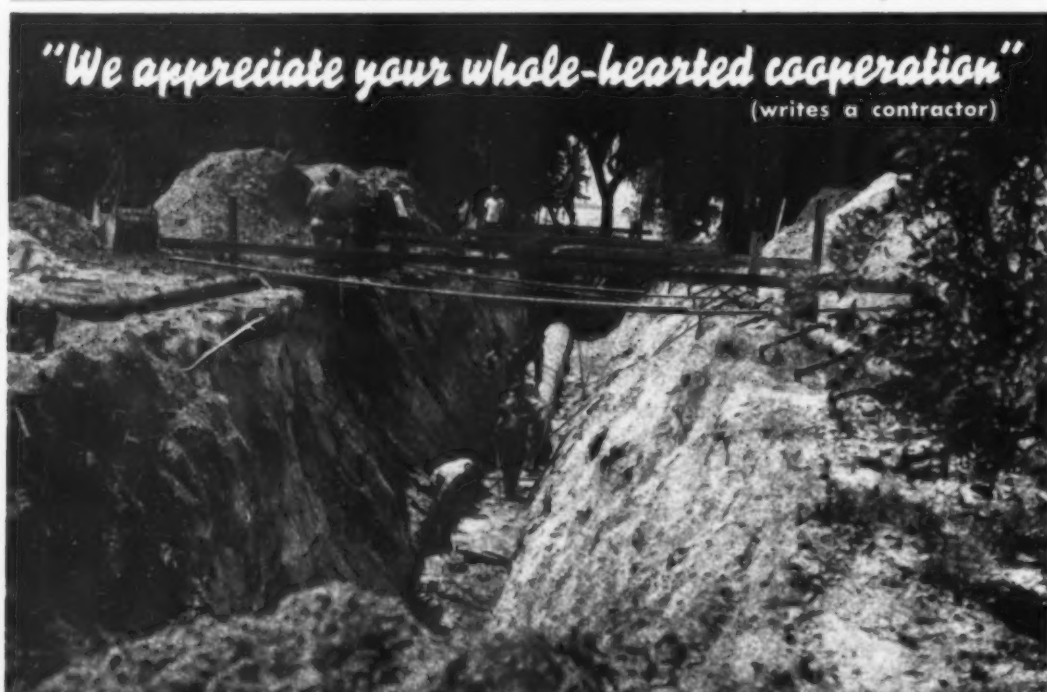
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52 Vanderbilt Avenue, New York, N. Y.

RITECURE is sold by:

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"We appreciate your whole-hearted cooperation"
(writes a contractor)

Progress on this job was 300' of sewer per day — in a bone dry trench.

Count on it when you order a MORETRENCH WELLPOINT SYSTEM.

It's evident in the careful lay-out and suggestions you receive for pumping the job —

• in the prompt delivery of equipment —

• in the expert installation and operation by experienced Moretrench demonstrators.

It's a characteristic part of our service always, and of particular importance today when a fast dry start on a wet job is a must!

MORETRENCH CORPORATION

90 WEST ST., NEW YORK

Rockaway, N. J. • Joliet, Ill. • New Orleans, La.

FOR AIR RAID PROTECTION manufacturer offers two aids: barrel pump extinguisher (top photo) and sand barrel (lower photo). Extinguisher consists of 20-gal. barrel mounted on wooden wheels for trundling to place of use. For carrying from floor to floor two handles are attached.



Stirrup-type pump with 12-ft. length of hose and nozzle fits into top of barrel which has hinged cover. Axe is attached to side of barrel for use as required. Assembly is painted bright yellow for most visibility in dark. Imprinted on barrel are words, "For Air Raid Use Only." May be stored in industrial plants, office buildings, apart-

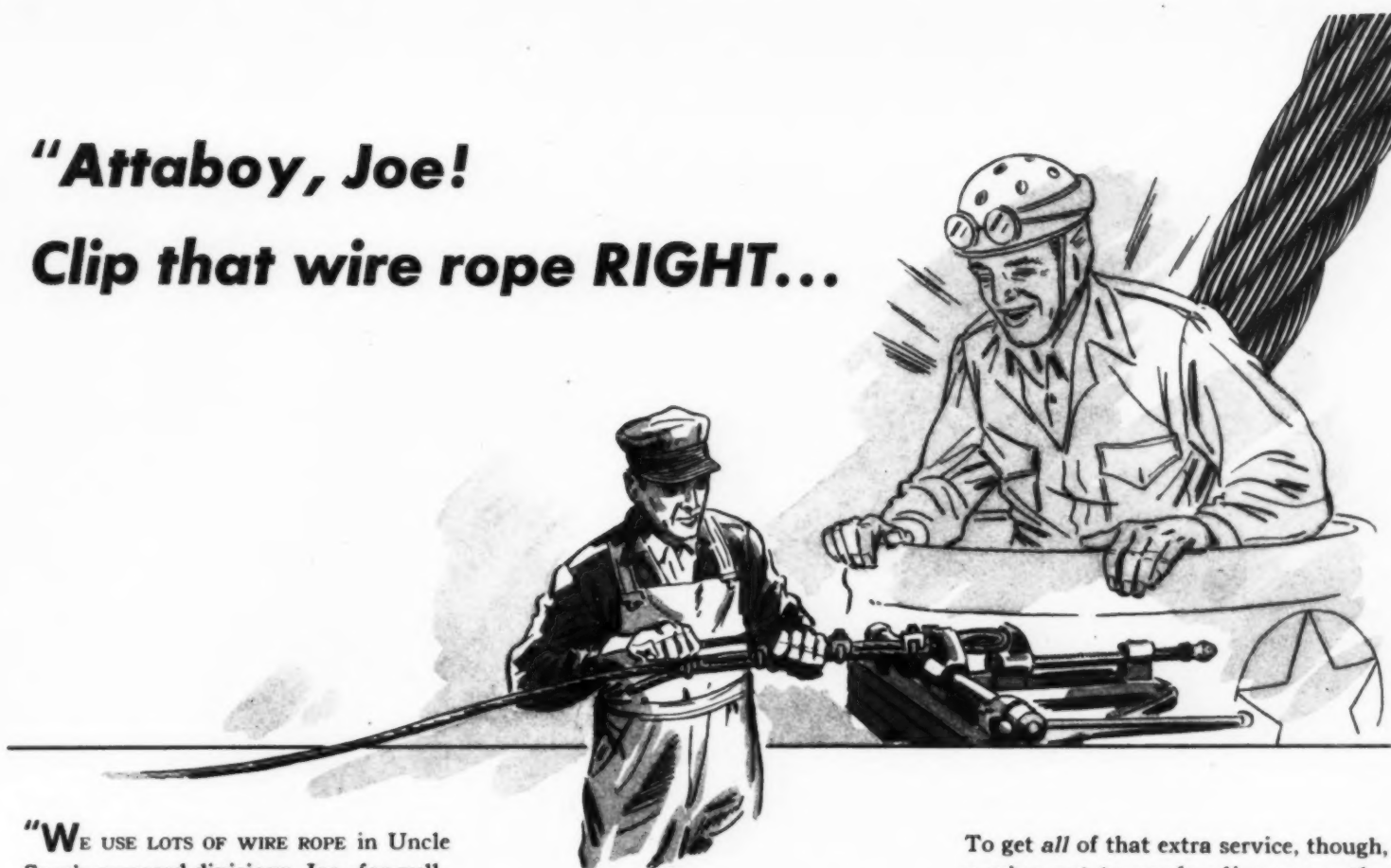


ment houses, homes and, if checked periodically for water capacity, will be ready for instant use. To insure adequate supply of sand and necessary fire fighting tools is provided wheel-mounted, open-top sand barrel of 2½-cu.ft. capacity equipped with handles for removal up or down stairs. Long handled shovel and axe also are furnished. Barrel is painted yellow and imprinted with same legend as stirrup pump barrel and will be covered with luminous paint, at extra cost, if desired.—Specialties Manufacturing Co., Inc., 35 Farrand St., Bloomfield, N. J.

★ ★ ★

TO AID IN CONSERVING RUBBER for war needs, all-steel portable mounting has been substituted for rubber-tired trailer on this P&H gas-engine-driven welder which may be had in capacities ranging from 15 to 370 amp. and which are shipped for Army, Navy and Lend-Lease orders unless otherwise stipulated. New trailer is two-wheel type equipped with axle and heavy-duty springs and is suitable for field work and highway towing. Wheels have 24-in. diameter and 4-in. rim face and are designed to permit quick change-over to pressed steel wheel with pneumatic tire when available. To compensate for harder riding of steel rimmed wheels, new unit is built for heavy-duty service with 9-leaf spring as well as extra heavy axle.—Hamischfeger Corp., Milwaukee, Wis.

"Attaboy, Joe!" Clip that wire rope **RIGHT**...



"WE USE LOTS OF WIRE ROPE in Uncle Sam's armored divisions, Joe—for pulling out of tight spots, for towing disabled tanks and trucks, for handling heavy replacement parts . . . And we use it right and *fasten* it right, because we know men's lives in battle may depend on its being just as strong as it's supposed to be!"



Keeping wire rope "just as strong as it's supposed to be" is important *wherever* wire rope is used—on fighting front or production front! One factor in rope strength is correct fastening. *Properly used*, clips make a convenient and sat-

isfactory fastening, developing 75 to 90 per cent of the rope strength.

When we build "Blue Center" Steel Wire Rope here at Roebling, we put in all the extra value of 100 years of wire-rope engineering. But even "Blue Center" Steel Wire Rope can't give extra service unless *enough* clips are used in fastening. The table below gives data for clipping "Blue Center" Wire Rope.

NUMBER OF CLIPS REQUIRED FOR "BLUE CENTER" STEEL WIRE ROPES			
Rope Diameter	Number of Clips	Spacing of Clips	Length of Wrench
1/2" to 5/8"	4	3 1/2" to 4 1/4"	12"
3/4" to 7/8"	5	5" to 5 3/4"	18"
1" to 1 1/8"	6	6 1/2" to 7 1/4"	24"
1 1/4" to 1 3/8"	7	8" to 8 3/4"	24"
1 1/2"	8	9 1/2"	24"

To get *all* of that extra service, though, you've got to apply clips correctly. Always use a standard wire-rope thimble. Put the clip U bolts on the dead end of the rope. Tighten bolts securely, but *do not crush rope*! Retighten all clips after an hour's full



running time and also at all regular inspections. By following these rules for proper clipping, you'll be helping to keep rope on the job for Victory.



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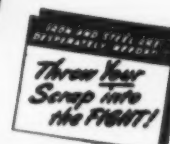


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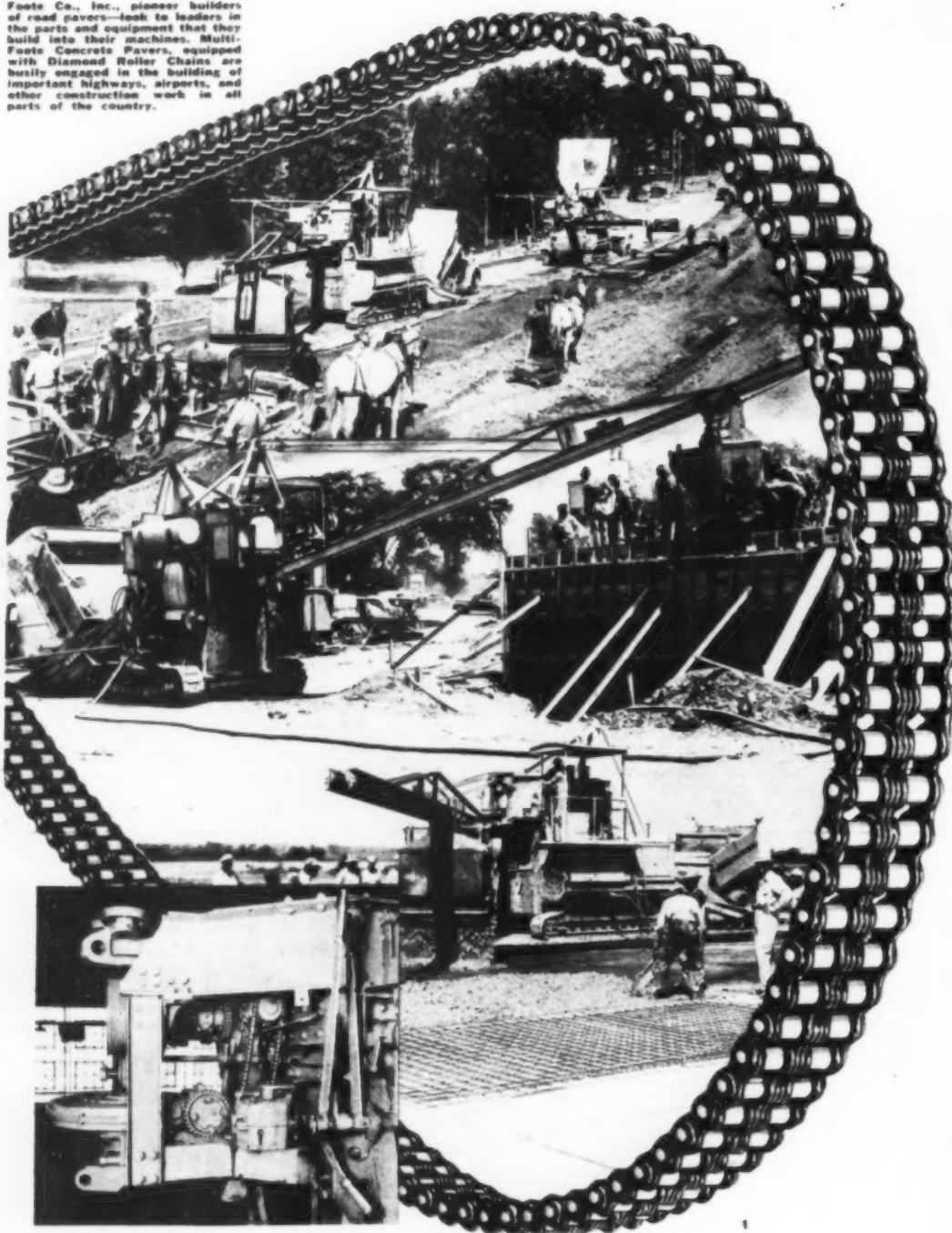
"Blue Center"

STEEL WIRE ROPE

PREFORMED OR NON-PREFORMED



Foots Co., Inc., pioneer builders of road pavers—look to leaders in the parts and equipment that they build into their machines. Multi-Foots Concrete Pavers, equipped with Diamond Roller Chains are busily engaged in the building of important highways, airports, and other construction work in all parts of the country.



Multi-Foots Pavers standardize on **Diamond Chain Drives, too**

● Highways and by-ways, airport runways, river levees and revetment slabs, airplane and large industrial plant walls, floors, and approaches—are poured by versatile Multi-Foots Pavers.

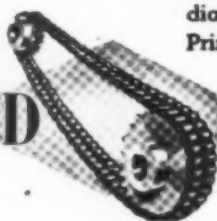
These modern machines, like most of today's finest construction equipment, are designed and built with machine-tool-like precision—and are equipped with the kind of drives used by leading manufacturers of all types of modern ma-

chinery and in our most efficient plants—DIAMOND anti-friction Roller Chain Drives.

It is significant that such leaders as Foote Co., Inc., standardize on DIAMOND Chains, their selection of the best available materials and parts being another reason for the successful long-life performance of their pavers. DIAMOND CHAIN & MFG. CO., 418

Kentucky Avenue, Indianapolis, Indiana. Offices and Distributors in All Principal Cities.

DIAMOND



ROLLER CHAINS

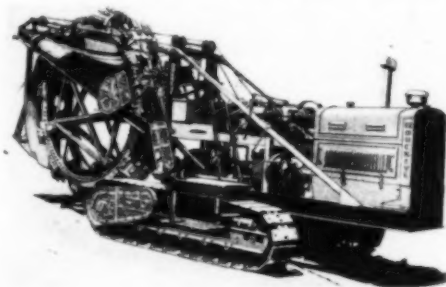
RIP-CORD CLOSURE is new method of closing cotton and burlap bags providing quick means of opening them without injury to material. Rip-Cord is sewed into closure of bag with regular 2-thread bag closing machine prepared for this work by minor adjustments only. Quick jerk of



cord opens bag instantly. Ten Rip-Cord bags may be piled on hand truck, which will accommodate only eight tied top bags and this saving results in fewer trips from warehouse to freight car and vice versa. Users who have been closing bags with wire ties may order bags 2 in. smaller, thus economizing in bag costs. By pulling Rip-Cord part way across bag, convenient pouring spout is provided.—Bemis Bro. Bag Co., 601 S. Fourth St., St. Louis, Mo.

★ ★ ★

WHEEL-TYPE TRENCHER, for work on new pipe lines, drainage ditches, army camps, municipal work and other excavating projects, digs straight-sided, round bottom trench so that pipe may be centered when lowered into place. Digging buckets cut to maximum width of 24 in. for placing of tile or conduit 4 to 18 in. Small trenching bucket may be used and 15-in. cut may be made where service pipe and ducts of small diameter are to be installed. Compactness and maneuverability enable trencher to operate in close quarters, in



parkways, alleys, close to curbs, foundations or lighting standards. With bearing area of 6 lb. per sq. in., trencher is said to be easy on lawns and to be able to travel on soft ground. Features: (1) Four-point support of digging wheel permits steel runs on which buckets are mounted to withstand static load, shock and torsional stresses under severe service; (2) constant center drive provides smooth transmission of power to digging wheel, eliminating rapid chain wear and breakage; (3) clutch protects transmission by serving both as throw-out and friction safety in case digging wheel strikes some immovable object underground; (4) digging speeds from 19 to 420 in. per min. through interchangeable sprockets. Eight transmission controlled digging speeds ranging from 19 to 87 in. per min.; (5) arcuate conveyor discharges excavated soil to either side and because of its concavity, throws earth in arc well back of brink of trench.—Buckeye Traction Ditcher Co., Findlay, Ohio.

"With Gulf Lubricants

our trucks stay out of the repair shop



and operate more efficiently on the job"... says Treasurer of builders' supply company

"WHEN a customer's job is ready for the concrete, we have to keep our trucks moving fast — and we can't take chances on breakdowns," says R. S. McSorley, Treasurer of the Whittemore Company, builders' suppliers. "That is why we have standardized on Gulf lubricating oils and greases. These quality lubricants help us get *continuous and efficient service from every unit.*"

Here's one important reason why so many leading contractors regard the use of Gulf quality lubricants as an important safety measure: Gulf lubricants have greater stability and endurance — they stand up and provide full protection to contractors' equipment even under severe operating conditions. Mud, dust, or sand—hot or cold, Gulf lubricants insure top-notch performance and a minimum of costly delays.

You, too, can benefit by using Gulf quality lubricants on your next contract. Write or 'phone your nearest Gulf office today and ask a Gulf engineer to call. He will recommend the proper types and grades exactly suited for your particular requirements.



The Whittemore Company, Roslindale, Mass., which supplies concrete and other building materials to several important construction projects in the Boston area, operates a large fleet of transit concrete mixers. The efficient trouble-free operation of this equipment is insured by the use of Gulf quality lubricants and fuels.



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PHOTO BY U. S. ARMY SIGNAL CORPS



WILL OUR MEN LOSE BATTLES FOR LACK OF STEEL?

WAR IS HELL! Yet this war could be worse than hell. Crucial battles will be lost and needless thousands of lives sacrificed unless our fighting men get all the equipment they need.

LET'S LOOK AT THE COLD HARD FIGURES: Most of this equipment is largely made of steel. Our steel industry made 67 million tons in 1940. It broke all records by producing 83 million tons in 1941. *Yet we need still more.* The steel industry must go on producing ninety million tons or more a year as long as the war lasts. So keep on searching for scrap and turn it in as fast as you get a load.

WHY SCRAP IS NEEDED: New steel is made from scrap iron and pig iron—about half and half. Because the scrap has already been refined it cuts down priceless production time.

WHAT CAN YOU DO? Plenty! Gather up all worn-out or obsolete tools, equipment and other useless materials. Urge your associates to do the same. Then call the scrap dealer. He'll hurry it off to the steel mills to help win battles, save lives and shorten the war. All scrap collected will be purchased by the steel industry at government-controlled prices.

BACK UP OUR FIGHTING MEN: The least you can do for our fighting men, perhaps someone close to you, is give them the equipment they *must* have. Will you? Every minute is precious. Get in the scrap—fast. Armco Drainage Products Association, 985 Curtis Street, Middletown, Ohio.



This advertisement is in support of the Salvage Program of the Conservation Division of the War Production Board.

Page 94 - CONSTRUCTION METHODS - October 1942

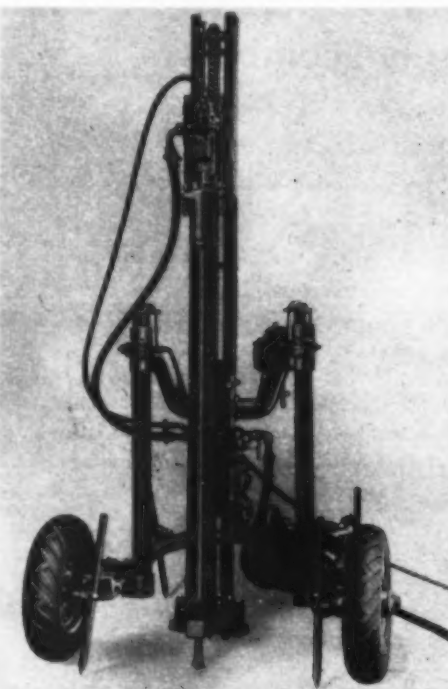
CELLULAR GLASS INSULATION, new product made up of thousands of tiny airtight cells weighing only one-fifteenth as much as ordinary glass, is available in 12x18-in. panels having standard thicknesses of 2, 3, 4½ and 6 in. Cellular structure of product, called Foamglas, is characterized by slight vacuum within cells that provides



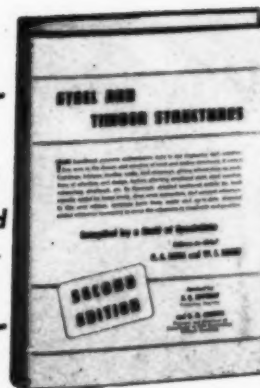
barrier to passage of heat and is claimed to offer solution to moisture problem prevalent in low temperature field. Material is fireproof and waterproof and will not rot, mold or decay. It can be sawed and worked with ordinary tools. Foamglas is manufactured by Pittsburgh-Corning Corp., for exclusive marketing by Armstrong Cork Co., by firing ordinary glass mixed with small quantity of pure carbon. Carbon turns into gas which then acts upon molten glass to produce "cellulated" product in form of rigid vitreous slabs. — Armstrong Cork Co., Lancaster, Pa.

BLACKOUT ALARM CONTROL has been developed to meet blackout alarm problem in factories where din of machinery and other noises prevent workers from hearing external air raid warning sirens. Photoswitch control is placed in convenient location where it can view centrally controlled street lamp. Through Photoswitch are connected alarm systems operating inside factory and when street lights are turned out, alarm is sounded. Control is designed to operate independent of effect of momentary flickering of street lamp and also independent of surrounding light conditions. — Photoswitch, Inc., 21 Chestnut St., Cambridge, Mass.

IMPROVED DRIFTER, developed for wagon drill service in which drilling of deep holes is usually required, has several new features which include positive method of blowing, directing more blow-



ing air through drill steel to bottom of hole where it is needed, and preventing air from escaping around sides of shank. Unit has longer stroke and heavier piston which provide strong rotation and striking force necessary to overcome inertia of heavy drill steel. They also permit use of larger bits. — Ingersoll-Rand Co., 11 Broadway, New York City.



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in designing
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buildings
bridges
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Hool and Kinne's STEEL AND TIMBER STRUCTURES

Revised by R. R. Zipprott
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and D. M. Griffith
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tables and charts, \$6.00

IN THIS comprehensive manual, a distinguished staff of specialists present complete information on the design and construction of buildings, bridges, trestles, tanks and chimneys. The book provides specific information on problems of selection and design, factors affecting structural steel, steel erection, estimating steelwork, etc., with explanatory illustrations and diagrams, step-by-step procedure and suggestions, up-to-date practices — everything to aid you in saving time, effort and money at every stage of steel and wood structural work.



11 big sections give you tested design data and practical construction helps. Here are just some of the details covered—

- foundations
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for the
Shovel, Dragline & Crane
Operator



★ You who have LIMA shovels, draglines and cranes are fortunate in having machines that are built to serve their owners throughout a long, profitable life, but regardless of how good a machine is, it requires normal servicing. Today when it is difficult to get new equipment because of war work, it becomes definitely important that you give your present equipment proper care. To assist you in this respect we have prepared a 32 page booklet, titled, "Timely Tips for the Shovel, Dragline and Crane Operator." The booklet is full of information to help the operator get better and longer service from his machine. *Your copy is ready, write for it today.*

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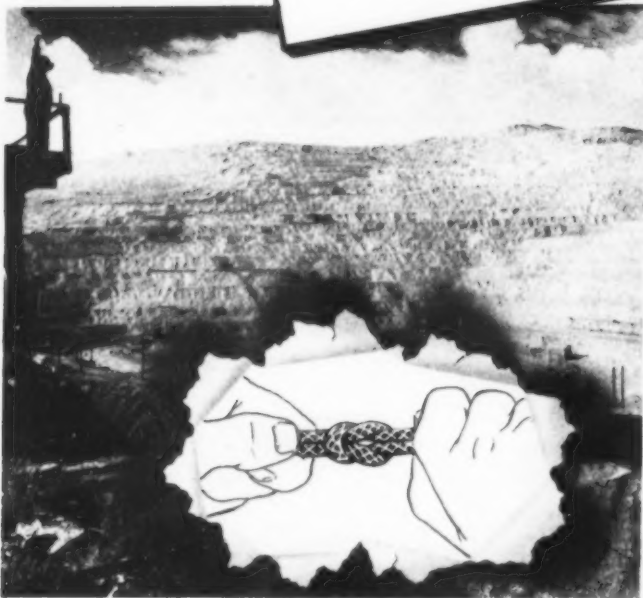
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Yes — you can use odd length of Primacord to make up the trunk lines provided you tie the lengths together with a square knot, *drawn tight*. It's got to be tight because it has to pass an explosive wave that is traveling at the rate of 20,350 feet per second!

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It always pays to be extra careful in every operation connected with blasting — and the proper use of Primacord-Bickford Detonating Fuse pays big dividends.

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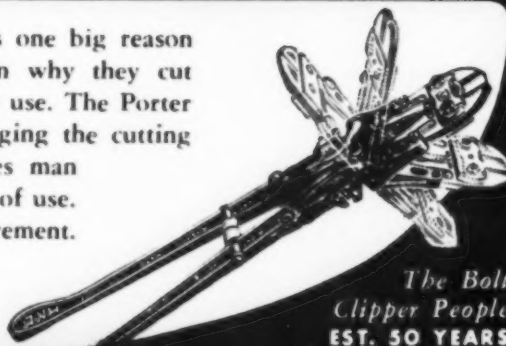
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• Here is the clipper story — every type, model and capacity. When you're concreting a stretch of highway — pouring floors on a building job — putting in a dam or a heavy foundation — you need Porter Bolt Clippers. They will save you time and money in cutting reinforcing fabric or rods — trimming off the wires after removal of forms — cutting bolts or chain — splitting nuts — cutting wire rope. One or more Porter Cutters will "earn their keep" on any contracting job. Send for this book today.

PORTER SWIVEL Cutter

The heat treating of these cutting jaws is one big reason for Porter Clipper efficiency — the reason why they cut tough steel and stand up under continuous use. The Porter Swivel Cutter with the "wrist action" bringing the cutting head to the work — around corners. Saves man power — speeds up work; proved by years of use. There is a Porter model for every requirement.



The Bolt
Clipper People
EST. 50 YEARS

PRACTICAL ADVICE ON CONSTRUCTION Equipment MAINTENANCE

Under present war conditions, construction equipment is difficult or impossible to replace with new machines. It becomes necessary, therefore, for construction men to adopt every possible means of extending the productive life of their equipment now in service. With a full appreciation of this critical situation, many manufacturers of machinery have recently published information telling how proper maintenance and operation can be employed to keep their machines running. Brief reviews of this type of trade literature follow: — Editor.

CONVEYOR AND POWER TRANSMISSION BELT LACING AND FASTENING—Flexible Steel Lacing Co., Chicago, Ill. (Booklet, 72 pp. plus 4 bulletins.) A description of various types of belting introduces this informative booklet, followed by a short account of old methods of making belt joints and a longer exposition of the advantages in time, strength and length of service that are to be gained by employing Alligator steel belt lacing and Flexo belt fasteners and rip plates. Also given in the booklet are technical tables showing the load that can be carried and the speed at which various types of belt can be operated. Much other valuable engineering data are included. In the bulletins are to be found many ways of prolonging the life of belts of all types employed for various purposes.

★ ★ ★

INDUSTRIAL RUBBER PRODUCTS CONSERVATION—Goodyear Tire & Rubber Co., Akron, Ohio. (40 pp. illustrated.) A complete treatise on the best methods of handling conveyor belts, power belts, hose, drop curtains, and Plowel installations in order to assure a more useful life. Practically all the "don'ts" applicable to industrial rubber in its many forms; as well as most of the "must do's" are illustrated with well-conceived line drawings.

★ ★ ★

GRAVEL AND ROCK CRUSHING AND SCREENING PLANTS—Iowa Mfg. Co., Cedar Rapids, Iowa. (142 pp. plus numerous inserts and many illustrations.) Issued as the instruction book for setting-up, maintaining and operating the Army mobile gravel and rock crushing plants manufactured by this company. In its pages will be found in fullest detail a description of the many procedures that should be followed by those who own and utilize this particular assemblage of equipment. The book has been very carefully assembled to the end that its readers can find all the information pertinent to an economical operating of the described machinery.

★ ★ ★

TIRES IN CONSTRUCTION AND ALLIED FIELDS—Firestone Tire and Rubber Company, Akron, Ohio. (112 pp. illustrated, many engineering tables.) A satisfactorily full treatment of the many types of tires made by this company for the multiple uses demanded by construction. In addition, much interesting and valuable information is displayed showing the various kinds of tire failures and telling how each is best to be avoided. Ten pages of tabulations exhibit recommended types for various vehicles. The two booklets give valuable data for the users of trucks, buses, trailers, passenger cars and industrial vehicles, as well as directions for keeping commercial vehicles operating during these critical days.

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ADAMS EQUIPMENT HELPS BUILD OUR NAVAL BASES



The victories of our fighting navy are being won by the ability of our ships and aircraft to be in action at the right spot at the right time! To insure such timely contact with the enemy it is necessary to establish a gigantic chain of land bases throughout the world, and in the building of these bases, Adams equipment plays an important part . . . Motor graders level and grade the runways, taxi-ways and aprons; mix and lay stabilized surfacing materials at naval air stations. Hauling scrapers cut, level and fill sites for shore supply depots, training stations and shipyards . . . On every job the dependability and easy operation of Adams equipment helps naval constructors keep pace with the expanding sea and air forces of the American Navy!

J. D. ADAMS COMPANY • INDIANAPOLIS, INDIANA
Sales and Service throughout the World



Adams heavy-duty motor graders have the power and traction to work the sandy soil of coastal areas . . . Views show grading of runways at naval air station and building access road to new naval base and air station site.

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TO KEEP YOUR EQUIPMENT ROLLING . . .
service and overhaul it regularly. See your nearest Adams dealer
for new machines available under priority rating and for repairs
and service on your present equipment . . . Wherever you are or
wherever you go Adams co-operative service is near at hand.

ADAMS

ROAD-BUILDING AND EARTH-MOVING EQUIPMENT

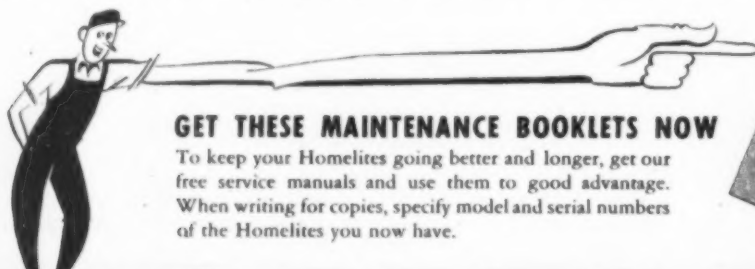
The POWER of SMALL TOOLS



Rushes Work through the Day Small, electric hand tools — such as saws, drills, sanders, vibrators, etc. — save time on important jobs. But these electric tools need operating power. Hundreds of contractors get this power from Homelite Portable Generators — handy, self-operating, gasoline-engine-driven units that are easily and quickly put into operation anywhere.



Rushes Work through the Night For those that work the night shift, Homelite Portable Generators furnish electric power for operating brilliant floodlighting — so necessary for fast and safe work. With capacities up to 3,000 watts, Homelite Portable Generators can be used to operate floodlights and several electric hand tools, all at the same time.



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To keep your Homelites going better and longer, get our free service manuals and use them to good advantage. When writing for copies, specify model and serial numbers of the Homelites you now have.



HOMELITE

The HOMELITE CORPORATION, 1810 Riverdale Avenue, Port Chester, New York

Page 98—CONSTRUCTION METHODS—October 1942

Wire Rope

A. LESCHEN & SONS ROPE COMPANY, St. Louis, Mo. (44 pp. illustrated.) Practical advice on how to prolong the useful life of wire rope by always considering its special character. Also contains description of many time-tried methods of binding, splicing and handling this material so essential and so important during this period of war shortages.

AMERICAN STEEL & WIRE COMPANY, Cleveland, Ohio. (50 pp. illustrated.) Complete instructions for field and factory employment of all types of wire rope, together with tested and approved methods of obtaining the maximum life from this product.

MACWHITE COMPANY, Kenosha, Wis. (4 pp. illustrated, plus many informative bulletins.) A collection of wire-rope users' experience, outlining the science by which this material's life can be extended. The informative bulletins treat of the effects of, and the way to avoid, corrosion, the value of using sheaves made from a material of proper hardness, the destructive effects of not lubricating rollers, the advantage of thoroughly lubricating rope, the virtue of a regular inspection of an installation, the saving in time and money brought about by selecting the correct rope for equipment, and ways to make your dollar go farther and conserve steel.

JOHN A. ROEBLING'S SONS CO., Trenton, N. J. (92 pp. illustrated.) A comparison of the various grades and types of wire rope, including a brief discussion of the uses to which each is especially suitable, and many tables showing the load-carrying capacity of most sizes as well as other important engineering data. Full data concerning most types of clips, thimbles, sockets, hoods and clamps are given.

UNION WIRE ROPE CORPORATION, Kansas City, Mo. (4 booklets plus various educational bulletins.) A complete and practical education in wire rope engineering can be obtained from the numerous publications of this company. Of the booklets, one treats of "Socketing," one of "Correct Handling," one of "Splicing Wire Rope" and another is a general dissertation on wire rope considered as the "Steel Tendons of Modern Industry." Educational bulletins appear under the appropriate name "Rope Dope," and individually deal with various types of wire rope, the forces destructive of this material and the care necessary to conserve it, and, among others, the methods of installation approved by this company.

★ ★ ★

POWER SHOVELS AND CRANES—Thew Shovel Co., Lorain, Ohio. (149 pp., illustrated, price \$1.00.) Loose-leaf handbook descriptive of the operation, care, adjustment and use of power shovels, cranes, draglines, skimmers, backdiggers, moto-cranes and shovels. Included are complete directions for operating the controls in Lorain shovels of all types and thoroughly competent sections descriptive of the power plant and the transmission. The inspection, lubrication and adjustment of various mechanical parts are treated in detail.

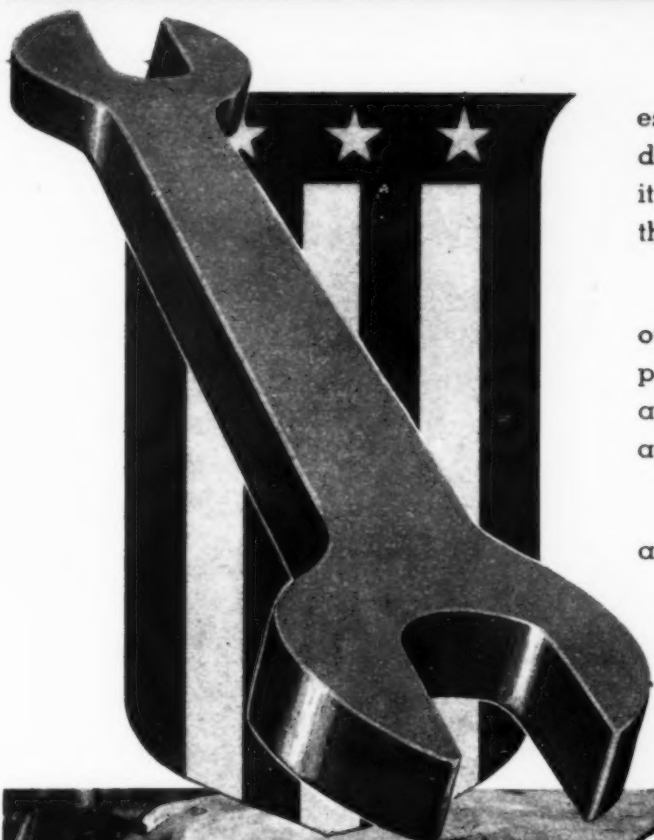
★ ★ ★

LUBRICATION—Standard Oil Company (Indiana). A folder that points out the destructive effect of heat on the important parts of the internal combustion engine. Also, suggests how this destroyer can be minimized by the use of a properly engineered lubricant.

★ ★ ★

TRUCK MAINTENANCE—Service Division, General Motors Truck and Coach Co., Pontiac, Mich. (17 pp., illustrated.) A compilation of the methods found satisfactory by a large manufacturer in keeping up a preventive maintenance service on trucks. Each item of the mechanical set-up is treated fully to indicate how users can obtain maximum service at this time when wear is as important as war. Also available from the same company are numerous folders illustrative of ways in which truck owners can aid our war effort by properly maintaining their rolling equipment.

Adjust Yourself to Victory



To keep your excavator operating efficiently over the longest possible period, adjustments must be made promptly. A dragging clutch not only wears out its band too soon, but it steals power, and may result in unnecessary stresses throughout the parts functioning in the operating cycle.

Improper adjustments may not show up at once in output figures because a skillful operator can often compensate for them. In the long run, however, repair costs and delays resulting from poor adjustments will cut output and increase costs.

The time required to keep all parts of your excavator adjusted correctly will be more than repaid in decreased power consumption and lower maintenance costs.

Follow your manufacturer's recommendations for care and maintenance carefully and you will keep your excavator going at top speed for Uncle Sam.



Bucyrus-Erie

S O U T H M I L W A U K E E , W I S C O N S I N

Reprints of this ad are available for your bulletin boards. In the reprints, the Bucyrus-Erie signature is omitted to leave room for your own name. Write for your copies.

LIFT HI-POWER



**THE HEAVIEST JAWS
OF ANY BUCKET OF
ITS KIND...**

Giving it a bowl which
will stand any amount of
battering and still hold
its shape...Chisel or Pick-
Point Teeth.

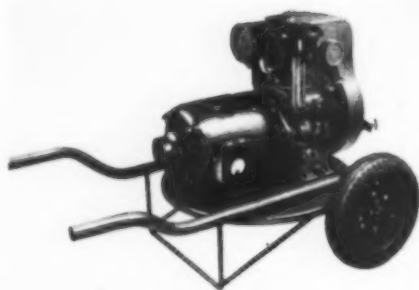
Buckets in stock at New York, Philadelphia, Baltimore,
Atlanta, Richmond, Charlotte and Los Angeles... Write
or wire for prices, delivery and catalog details.

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MASTER EQUIPMENT

**ON RUSH JOBS TODAY
DEPENDABILITY means maxi-
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Master Equipment is competitive in price
and is built of the very highest quality of
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utmost in performance with long life and
uninterrupted service in the use of same.



PORTABLE GENERATOR SETS

Capacities 650 Watts to 9400 Watts

Master offers 21 Standard sizes of con-
tinuous-duty, ruggedly-built, gas-powered
Generator Plants, to furnish power for
lighting, saws, tools and Master Electric
Vibrators, and other standard electrically
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MANUFACTURERS OF • Gas-Electric Generator Plants,
500 Watts to 9400 Watts — AC or DC • "Big 3" Gas-
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Speed Tools. Master Distributors throughout United States
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MASTER No. 23 GAS CONCRETE VIBRATOR

Also a complete line of Electric Powered
Concrete Vibrators — ½ HP to 3 HP.

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DAYTON, OHIO

Excavation and Grading Equipment

THE OSGOOD COMPANY, Marion, Ohio. (328 pp. illustrated.) Bearing the official Army designation, TM5-2104, this book presents, in concise form, a manual for the operation and maintenance of Model 200 shovels, draglines, clamshells, cranes, back-hoes and piledrivers manufactured under War Dept. Purchase Order 53596. Containing a complete chapter on maintenance, and a separate chapter on parts as on the Buda power plant, this book should prove indispensable for all owners and operators of this well-known line.

R. G. LE TOURNEAU, INC., Stockton, Calif. (3 pamphlets with a total of 80 pp. Illustrations plus the "Co-operators.") The operation, maintenance and repair of dozers, rotozers and sheepsfoot rollers is completely described and the range of usefulness of these well-known implements is adequately covered, each under a separate cover. In the "Co-operator" will be found considerable information touching upon the accomplishments of many of this company's products. Hints regarding the most economical ways of utilizing all earth moving equipment also is given.

J. D. ADAMS COMPANY, Indianapolis, Ind. (56 pp., illustrated.) A manual prepared for "the use of those who operate and service the machines" of the Adams Company. Conveniently arranged to permit ready reference to the point under question, it gives the reader a clear insight into the adaptability and characteristics of the modern motor-driven grader. Emphasis is placed on the importance of the proper use of a grader, if low maintenance costs are to be kept in mind.

★ ★ ★

Motor Truck Conservation

THE WHITE MOTOR CO., Cleveland, Ohio. (8 pp., mostly illustrations.) A clear presentation via photo reproduction of the reasons for the setting up of a truck conservation plan. The vital necessity of truck conservation should be appreciated by all truck owners. The plan advocated, which has been exhibited in full-page advertisements in leading magazines is a well thought through program for saving strategically needed man-hours, machines and metals.

THE FOUR WHEEL DRIVE AUTO CO., Clintonville, Wis. (Various monthly bulletins, each of 4 pp.) This method of driving an internal-combustion engine propelled vehicle had its first serious trial during our last run-in with Germany. The various monthly service bulletins issued by this company each treat in detail one or more of the to-be-watched points of a truck if its operator is at all concerned with the conservation of critical men, machines and materials.

MACK-INTERNATIONAL MOTOR TRUCK CORPORATION, Long Island City, New York. (8 pp. illustrated.) "Serve by Conserving" is the title of a small booklet embodying the experience of one of the most important manufacturers in the field of heavy hauling. In concise form, the many services that should be given a truck at various periods are displayed for easy check reference.

★ ★ ★

MAINTENANCE OF WIRE CABLES—Simplex Wire & Cable Co., Cambridge, Mass. (14 pp.) Listing of the various materials going into the manufacture of wires and cables, together with a statement covering the relative difficulty of obtaining each and a reasoned plea that these materials be conserved through the careful use of all supplies.

★ ★ ★

ROAD-BED COMPACTION—The Huber Manufacturing Co., Marion, Ohio. (28 pp. illustrated.) The care and operation of the 10- and 12-ton gasoline powered rollers of this company is well described. While the conservation of critical materials receives but scant overt mention, the necessity for care in this detail is covertly apparent in the writing of every page of this booklet.



15 TVA DAMS are SMITH-MIXED!

TVA DAMS

*Poured by
Smith Mixers:*

WILSON
WATTS BAR
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CALDERWOOD
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BLUE RIDGE
OCOEE No. 1
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Diagram of TVA
Water Control System



**Nation's Largest Construction Program
Calls for Millions of Yards of Concrete**

Work on TVA's Water Control system — the largest construction program ever undertaken in the United States — is progressing rapidly, thanks to the highly efficient TVA organization, plus well-designed, dependable equipment. Significant is the fact that fifteen TVA Dams are Smith-Mixed. Smith Tilting Mixers again have proved their inherent speed, efficiency and reliability — a reputation achieved over a period of 42 years on the world's greatest engineering projects — Boulder Dam, Panama Canal, San Francisco-Oakland Bridge, etc., etc.

The T. L. SMITH CO.
2851 North 32nd Street • Milwaukee, Wisconsin

SMITH MIXERS

USED ON THE WORLD'S GREATEST CONCRETE PROJECTS

WELLPOINTING THE WAY *to Victory!*



COMPLETE WELLPOINTS dewater 200' x 100' building site. Normal ground water level about 8' above subgrade. Note perfectly dry bottom, enabling contractor to conduct all foundation work under ideal working conditions.

☆☆☆ **VICTORY** in battle starts with production. Victory in production starts with construction. Every hour, every day, every week saved in the erection of America's new war plants speeds by that much time the tools needed by the Armed Forces. We are proud that **COMPLETE WELLPOINTS** perform yeoman time-saving service in America's War Construction Program.

Costly delays due to water hazards have been eliminated on scores of new ordnance projects. **COMPLETE's** patented fluted tube is so structurally sound that it withstands the horizontal pressure of pile-driving close to the wellpoint. This means that contractors can carry on their foundation work while the ground is being pre-drained.

Wellpoint your construction to victory **THE COMPLETE WAY!** Write, telephone or telegraph for complete details.



COMPLETE MACHINERY & EQUIPMENT CO. • INC.

Main Office: 36-40 11th Street
Long Island City, N. Y.
Branch Warehouse: Gary, Indiana

CONVEYING MACHINERY—Link-Belt Co., Chicago, Ill. Various issues of the house-organ of this concern contain much information on the conservation value that care and adequate maintenance can render the users of material transportation equipment.

★ ★ ★

POWER-DRIVEN DIAPHRAGM PUMPS—Novo Engine Company, Lansing, Mich. (44 pp. illustrated.) Perhaps there is no peace-time equipment more necessary to a modern army engineering corps than a pump. Under the Army designation TM5-500-8 has been issued in admirable form for ready reference, a "General Description and Characteristics of Novo Model AD Diaphragm Pumps" with adequate instructions for their care and operation. This handy manual should be found most useful to all who employ this type of pump for any of the many uses to which it is applicable.

★ ★ ★

SMALL POWER-DRIVEN CONSTRUCTION TOOLS AND ADJUNCTS—Mail Tool Company, Chicago, Ill. Workers are apt to treat power-driven small tools as if they were hand tools. The wasteful character of this old habit has been recognized by a maker of power-driven small tools, and he has printed complete instructions covering the care and maintenance of this line.

★ ★ ★

TO KEEP 'EM ROLLING—French & Hecht, Inc., Davenport, Iowa. (Folders, illustrated.) Being cut off from our usual supply of natural rubber, we will be forced to many expedients until the temporary shortage is relieved. Since practically all of our industrial equipment is transported on wheels, it behooves us to consider carefully the question of how and on what we will move our materials and machines. A new light-weight pressed steel wheel has been designed to conserve metal and to serve the construction industry. In quantities it can be obtained in any diameter.

★ ★ ★

PORTABLE DIESEL POWER—Cummins Engine Co., Columbus, Ind. (16 pp., illustrated.) The days of the construction worker as a laborer are fast disappearing. His place is being taken by an engine which is cheaper to maintain and does not tire. Maintenance, is, however, becoming more and more a matter demanding careful consideration, as the exigencies of war crowd our resources. The portable Diesel, if properly handled, is from many angles the most economical form in which extraneous power can be obtained. The care with which a Diesel's upkeep is maintained is so important that the booklet calls attention to the many points which should be constantly watched.

★ ★ ★

CONSERVATION OF MECHANICAL RUBBER GOODS—The Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc., Passaic, N. J. (Wall cards.) Three 9½x11-in. cardboard directions to be displayed in places where rubber hose and/or belts are used, remind workers what should or should not be done if the life of mechanical rubber goods is to be extended.

★ ★ ★

STORAGE BATTERIES SHOULD BE CAREFULLY MAINTAINED—The Electric Storage Battery Co., Philadelphia, Penna. (Two booklets, 46 pp., illustrated.) Particularly of interest to operators of automotive equipment are the two booklets, describing the precautions that should be observed when installing and utilizing this accessory to an internal combustion engine. Some of these "do's" and "don'ts" may have slipped users' minds in their anxiety to speed production. These booklets should serve to remind them of the importance of detail in servicing and keeping at its highest efficiency this essential piece of equipment.

New heat-proofed
STANOLUBE H.D.
Beats heat—Cuts wear—Cleans engines

HELPS SPEED ARMY CAMP CONSTRUCTION

To speed construction of an army camp in the Middle West, the equipment and personnel of over 30 contractors were thrown into the job. Practically every age and make of gasoline and Diesel powered trucks, tractors and shovels was represented, including 25-year-old engines and 1941 models.

This wide variety of equipment presented a difficult maintenance problem. In addition, the shortage of skilled operators and high labor turnover placed an added burden on the equipment.

To simplify lubrication, the new "heat-proofed" Stanolube H. D. was placed in all of the equipment. The six grades of Stanolube H. D. met all operating needs of both gasoline and Diesel engines, from the light break-in oil to heavy grades required by the older equipment.

In spite of the fact that much of this equipment operated 24 hours a day, there has been no ring sticking, no bearing trouble, no sludging or varnish build up, nor any engine failures due to lubrication.

Stanolube H. D. was produced for heavy duty service just like this. Over 25,000,000 test miles of operation, in all types of equipment, proved that this new "heat-proofed" oil practically eliminates engine deposits and carbon and varnish trouble. Change to Stanolube H. D. as your first step to conserve maintenance time and equipment life.

Ask your Standard Oil man for a copy of the folder "Beat Heat, Your Engine's Enemy No. 1" which tells why Stanolube H. D., the new "heat-proofed" oil (available only to fleet operators) will help make your equipment last longer.

STANDARD OIL'S FLEET CONSERVATION SERVICE HELPS TRUCKER INCREASE TIRE MILEAGE, VALVE AND BEARING LIFE

Increased mileage between valve grinds from 6,000 miles to 30,000 miles—lengthened precision insert bearing life from 18,000 miles to 50,000 miles by eliminating sludge and varnish trouble—reduced tire wear through correct chassis lubrication and maintenance.



These are a few typical examples, reported by a Standard Automotive Engineer, of how Fleet Conservation Service prolonged the life of fleet equipment for Bringwald's Transfer at Vincennes, Indiana.

Take advantage of this service. See if one of these Engineers hasn't a suggestion on preventive maintenance, inspection schedules, or more efficient fuels, lubricants, and lubricating methods to help you get every possible mile of operation from every part in your fleet equipment.



W. C. Bringwald (right), owner of a fleet of large transport trucks, a few of which are pictured below, and J. A. Mowbray, Automotive Engineer (left), discuss the importance of chassis lubrication, including tie-rod ends and other front wheel suspension points where wear can cause misalignment of wheels resulting in excessive tire wear.

HERE'S HOW TO GET STANDARD'S FLEET CONSERVATION SERVICE AND INFORMATION ON STANOLUBE H. D.

If you are located in the states listed below, take advantage of the Fleet Conservation suggestions which a Standard Automotive Engineer has for you. Write Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago, Illinois, for the Engineer nearest you. In Nebraska, write Standard Oil Company of Nebraska at Omaha.

COLORADO • ILLINOIS • INDIANA • IOWA • KANSAS • MICHIGAN
 MINNESOTA • MISSOURI • MONTANA • NORTH DAKOTA • WYOMING
 SOUTH DAKOTA • WISCONSIN

OIL IS AMMUNITION...USE IT WISELY



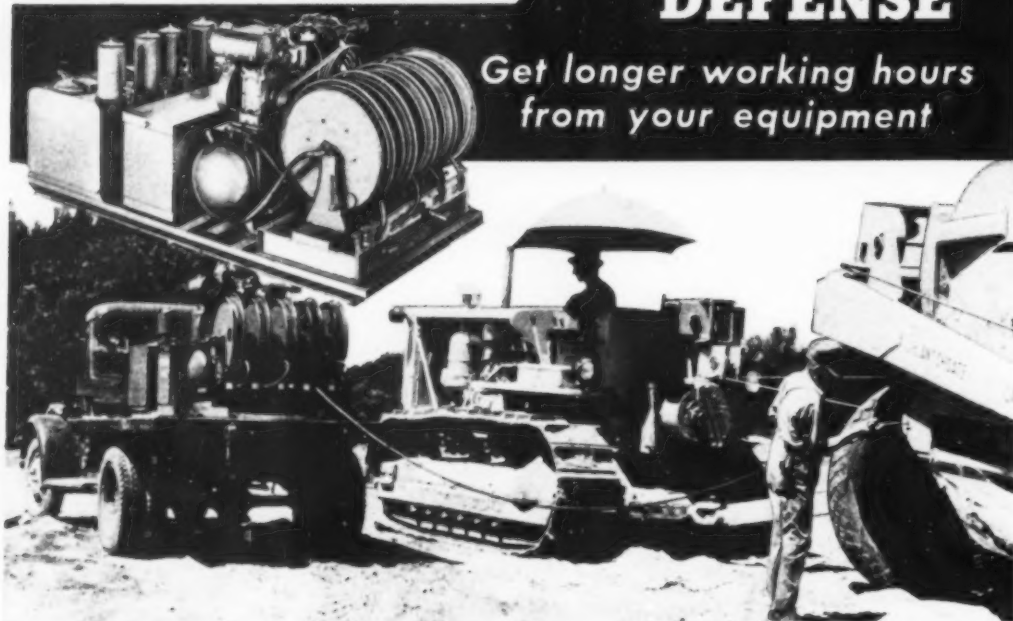
Sign up your fleet in the Office of Defense Transportation's Truck Conservation Corps. Help in this vital war effort by keeping your trucks rolling for the duration.

STANDARD OIL COMPANY (INDIANA)
FLEET CONSERVATION SERVICE

GRACO CONVOY LUBERS

To Conserve
Machinery for
**NATIONAL
DEFENSE**

Get longer working hours
from your equipment

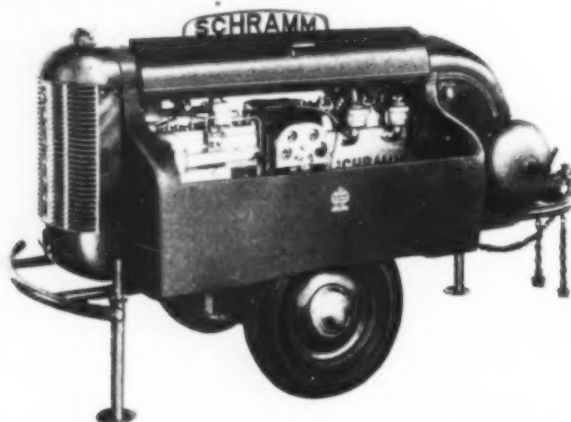


Regular lubrication of field equipment means longer life and conservation of vital machinery. Graco Convoy Lubers provide complete, compact, portable lubrication departments, for servicing equipment "on the job". Prompt deliveries assured. Write or wire for details.

GRACO
GRAY COMPANY, INC.
Minneapolis, Minn.

SPEED

TO GET
THINGS
DONE



There is no time for waste motion in this day of "giving it everything you've got". SCHRAMM, with a long record of superior performance, is ready to cope with all production problems. For instance . . . take SCHRAMM'S POLICY of basic design in building a compressor that is light in weight . . . is compact . . . has automatic controls and force-feed lubrication . . . is self-starting . . . is powered with both gas and diesel . . . and above all, is designed for economical engine speed that means . . . LONG LIFE!

If you want to get things done, "Do It The SCHRAMM WAY". Gasoline, Diesel or Electric Powered from 20 to 420 cu. ft. actual air.

SCHRAMM Inc.
AIR COMPRESSORS
WEST CHESTER, PA.

SCHRAMM—THE COMPRESSOR PEOPLE

CRAWLER-TYPE TRACTORS—Cleveland Tractor Co., Cleveland, Ohio. (8 pp., illustrated.) Ideas to help owners keep their equipment rolling or crawling. Pictures with competent descriptive captions show how many parts, subject to excessive wear, can be restored to their original efficiency.

★ ★ ★

TRUCK-LOADER—George Haiss Mfg. Co. New York, N. Y. (19 pp., illustrated.) Any contractor who has much material to move from a stock-pile or windrow to a truck—coal, gravel, earth or snow—will be interested in this bound "Instructions for Operation" of the Haiss Loader. Complete directions for unloading, lubricating and operating this man-hour saving equipment are given, as well as some general suggestions dealing with the best methods to employ in obtaining the optimum results.

★ ★ ★

MAINTENANCE OF INSULATED WIRE AND CABLES—The Okonite Company, Passaic, N. J. (Two folders, illustrated.) Most users of insulated wire probably think of it as an item that can be installed and forgotten, as a cast-iron water main may be. The vast experience of this company has demonstrated to it the fact that insulation, being an organic compound, will deteriorate unless certain conditions are guarded against. Chief among these are heat, sunlight, ozone from high voltage equipment (or sparking motors), oils, greases and certain chemicals.

★ ★ ★

SETTING UP FORMS FOR CONCRETE—Samuel S. Colt, Orange, N. J. (6-p. folder, illustrated.) A description of a method of employing paper tubes to inclose form-holding tierods in concrete construction, which saves up to 100 percent of the steel usually employed. Other Colt specialties also are described.

★ ★ ★

CONSERVATION THROUGH FRICTION REDUCTION—New Departure Division of General Motors Corporation, Bristol, Conn. (Two booklets, 36 pp.) Shop Manual gives instructions for the installation of ball bearings in industrial machinery. Other manual for automobile trucks and other automotive vehicles gives directions for installing ball bearings and maintaining them.

★ ★ ★

USE OF LIFTING JACKS—The Duff-Norton Mfg. Co., Pittsburgh, Penna. An attractive and legible card to display on the walls of places where lifting jacks are employed. Displays 12 "don'ts," all of which should be observed by everyone who uses this important piece of equipment. The advice given runs from a warning not to allow an incompetent man to handle a jack for lifting, to the admonition not to employ a jack which has been strained by overloading without first having it inspected and repaired.

★ ★ ★

INTERNAL COMBUSTION ENGINE OPERATION—Waukesha Motor Co., Waukesha, Wis. (Two booklets, 80 pp., illustrated.) Treatments of both the carburetor-type and the Hesselman-type oil engine. This latter engine is not a true diesel since it employs a spark-plug, rather than cylinder temperatures, to ignite the fuel. However, it possesses a number of advantages over the compression-ignition engine, all of which are covered in these interesting booklets. Both types of engines are manufactured by the Waukesha company, which has rendered an important service to those concerned with utilizing our natural resources to the full. A better understanding of the advantages of the various types of small prime movers can be obtained from these booklets.

BAY CITY BUILDS FOR THE U.S. ARMED FORCES



with TIMKEN FRONT and REAR DRIVING AXLES and TIMKEN TRANSFER CASES

Another U. S. victory in the battle of machines!

New 6 x 6 (6-wheel-drive) mobile cranes! — with greater "get there" ability than ever before! Ready to pull through to Victory on the fighting fronts and on the home front!

Fast, tough, dependable mobile cranes of this and similar types are designed to be "Jacks of many trades." They "get to work" under their own power, over rough or soft or hilly ground (thanks to their six driving wheels). And then they "go to work"—handling heavy materials on war construction projects, loading planes, ammunition, guns and other heavy equipment aboard ships, or performing any of the thousand-and-one other heavy lifting services required by Uncle Sam's Armed Forces.

The mobile crane illustrated was built by the Bay City Shovel Company. It has Timken Driving Axles, front and rear, and a Timken Transfer Case (for dividing the torque between the front and rear axles and supplying an extra low range of transmission speeds).

The ability of Timken-equipped vehicles to "get there fustest" through the toughest going explains why Timken Axles and Transfer Cases are "The Accepted Standard" for this and many other types of mobile cranes and shovels.

Free Timken "A.M." (Axle Maintenance) AIDS

To help you set up an "A.M." program to meet wartime needs, Timken has prepared many practical aids. A request on your business letterhead will bring any of these helps promptly and without charge. 1. Timken Field Service Bulletins. 2. Reprint, "How Tires Affect Axles." 3. Resume Booklet, "Systematic Axle Inspection and Maintenance." 4. Axle Inspection Wall Chart. 5. Reprint, "Causes of Axle Failures." 6. Reprint, "Horsepower vs. Torque." "What Makes a Motor Truck Go." "A Motor Truck Must Have What It Takes to Go Places."

TIMKEN AXLES



THE TIMKEN-DETROIT AXLE CO., DETROIT, MICHIGAN
WISCONSIN AXLE DIVISION, OSHKOSH, WISCONSIN

Timken: Builder of Battle Axles!

MERCER

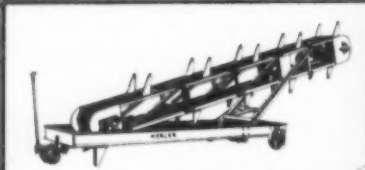
"THE NAME THAT CARRIES WEIGHT"



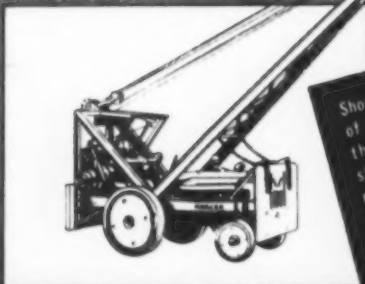
Industrial MATERIAL
HANDLING EQUIPMENT



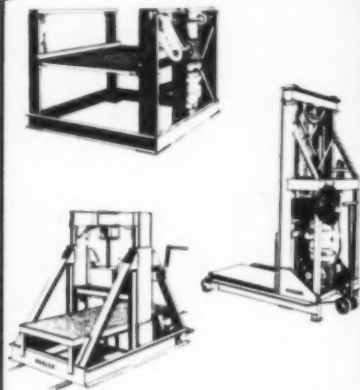
TRAILER TRUCKS — ALL SIZES



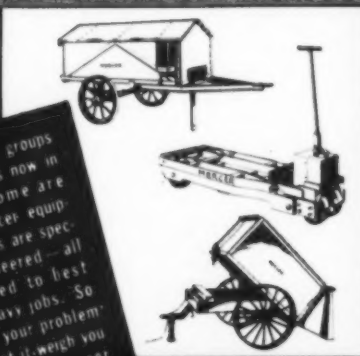
STACKERS & FEEDERS



WHEEL-TRACTOR CRANES



ELEVATORS & CONVEYORS



TRUCKS & CARTS

Shown here are groups of Mercer units now in the field. Some are standard Mercer equipment—others are specially engineered—all are planned to best handle heavy jobs. So whatever your problem—don't let it weigh you down. Call on Mercer for a lift!

MERCER ENGINEERING WORKS, INC.

Works: Clifton (Allwood), N. J.

Sales Office: 30 CHURCH ST. • Export Office: 80 BROAD ST.

NEW YORK

BUILDING INSULATION CONSERVES FUEL—Eagle-Picher Sales Co., Cincinnati, Ohio. (Two booklets, 14 pp.) The most certain way to conserve our oil- and coal-fuel supply is to stop allowing heat to leak into the uninhabited outer atmosphere, where it can be of no utility. Most effective in any attempt to achieve this end is the proper insulation of all walls and roofs of buildings which must be artificially heated. The Eagle-Picher Company has issued two booklets to show the ease with which these insufficient heat barriers can have their insulating qualities raised to an unsuspected extent. The employment of mineral wool either as batts or as blankets for new construction, or as a pneumatically applied insulation to old buildings, is not new, but its employment at this time would conserve much needed freight cars for better uses.

★ ★ ★

DIESEL ENGINE LUBRICATION—Kendall Refining Co., Bradford, Penna. (36 pp., illustrated.) An easily comprehended monograph-type booklet describing the operation characteristics of the diesel, or compression-ignition engine. Though it is intended reasonably to point out the advantages of a particular brand of diesel oil, its compendious character makes it a valuable introduction to the study of this type of prime mover.

★ ★ ★

Lubrication Service "On The Job"

ALEMITE DIVISION OF STEWART-WARNER CORPORATION, Chicago, Ill. (12 pp., illustrated.) Equipment time saved, materials conserved, man-hours reduced to the minimum! By adopting a schedule for lubricating widely-scattered power-driven equipment, and by operating the portable service stations described in this booklet, many concerns have attained each of these ends at a smaller dollar cost.

VALVOLINE OIL COMPANY, Cincinnati, Ohio. (72 pp. Tables.) Anyone desirous of obtaining a quick though adequate understanding of the theory lying behind the use and purposes of lubricating oil in his internal combustion engine—compression-ignition or carburetor type—should study this booklet which treats of the four functions which a lubricating oil should perform, and describes the reasons why a car owner should change the oil in his engine at regular periods. Also takes up the question of fleet lubrication service, tells briefly of Valvoline work in this field, and describes the manner in which improved engine design and construction made necessary the improvement in lubricants. Recounts the destructive effects of dust on the engine and lists the special oils that have been engineered by this company to meet present day demands. Complete chart indicates lubricants for use on all the wearing parts of most passenger car, truck, bus or aviation engines.

CARRY LUBRICATION SERVICE TO FIELD—Gray Company, Minneapolis, Minn. (39 pp., illustrated.) The necessity for heavy-duty road equipment, tractors, trucks and the like, is imperative. At no time more than during these war days, when every workable bit of equipment must be maintained at its most productive level, is this true. Drivers of trucks and other motor-driven equipment are, however, disposed to avoid trips to service stations, since it cuts into the time that could be used for "pay" loads. The answer to this difficulty is—Take the service station to the drivers! The folder here listed is descriptive of an assemblage of time-tested equipment gathered together to achieve this end.

HEAVY-DUTY OIL FOR FLEET OPERATORS—Standard Oil Company (Ind.) Chicago, Ill. (Illustrated folder.) A new, low-rate-oxidizing motor oil, engineered to withstand the higher temperatures generated in the modern internal combustion engine, is described in this illustrated folder. But because of war time restrictions on output, this new high duty lubricant is for the time being available only to fleet operators. Known as Stanolube H-D, this new heat-proofed oil is said to have valuable detergent, or cleaning, qualities, to eliminate "varnish" on pistons, to remove already accumulated sludge, and to be especially valuable in preventing "scuffing" of rings and pistons when breaking in new or reconditioned engines.



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YOU CAN HELP DO THIS JOB

Your country needs all possible steel for guns, tanks, ships and shells. All the *wire rope* that can be produced is needed for military and naval uses—and to speed war production in scores of industries. You can serve your country by taking care of *your* wire rope, so that replacement is postponed as long as possible.

FREE BOOK TELLS HOW

It illustrates and describes more than forty ways to *save money* on wire rope. The big pictures of right

and wrong ways make it easy to spot sources of too rapid wear—and *correct* them.

Many thousands of wire rope users throughout the world use this handy book as their guide to longer wire rope life. Now, with urgent war needs for steel and wire rope, it is doubly important that every wire rope user have a copy.

If you *must* have new wire rope to maintain uninterrupted war production, help us to help you by anticipating your needs as far in advance as possible, within priority regulations.



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Wickwire Spencer Steel Company
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- ☐ Send free copy of the book, "Know Your Ropes."
☐ Send free posters, 21" wide, of illustration at top of this page. No advertising appears, merely prize-winning title, "I Pull with Uncle Sam."

Name

Company

Address



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Sales Offices and Warehouses: Worcester, New York, Chicago, Buffalo, San Francisco, Los Angeles, Tulsa, Chattanooga, Houston, Abilene, Texas, Seattle. Export Sales Department: New York City.



HERE'S HOW to get more work out of a hand shovel

14 TIPS that speed digging and material moving, increase average workman's output without extra effort, save time and money. *Told with pictures.*

SEND FOR FREE COPIES for your foremen and posting up on the job.

and here is the RAZOR-BACK Shovel to do it

— the shovel men fight to use. Balanced with 60% more thickness up the center where it's needed, tapered to the sides.

THE UNION FORK & HOE COMPANY

553 Dublin Avenue
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Makers of

HAND SHOVELS, STONE, BALLAST AND OTHER INDUSTRIAL FORKS, ASPHALT AND ROAD RAKES — *Distributors Everywhere*

Dependable power for vital airfield construction — with **LE ROI** ENGINES

When your equipment is Le Roi-powered, you know you have extra power for the pinches—dependable power for the long pull—economical power to keep costs down. • Below you see a Barber-Greene bituminous paver laying runways at a Mid-

western airfield. Construction men everywhere are depending on Le Roi engines in critical situations today — to help them hold a reputation for coming through on time. Get Le Roi power on your next equipment. *Le Roi Company, Milwaukee, Wis.*

E-12

Many leading types and makes of construction equipment are Le Roi-powered



KEEP THE ROADS CLEAR FOR WAR—Carl H. Frank, Mr., Clayton, New York. (33 pp., illustrated.) Any blocked road can be a stoppage in the smooth flow of production. To aid in keeping roads open, the makers of Frink Sno-Plows have issued a binder which lists, in convenient form, the various parts of their equipment, designating each by name and number for easier ordering.

★ ★ ★

Air Compressors

GARDNER-DENVER COMPANY, Quincy, Ill. (20 pp., illustrated.) In order to insure a more perfect and error-free operation of their compressors, this company has issued an instruction booklet to give owners full instructions as to how best to start their "WB" line.

DAVEY COMPRESSOR CO., Kent, Ohio. (Booklets and separate illustrated folders.) The advantages in economy and utility of having your air compressor mounted on a separate truck (or tractor), rather than on a skid or trailer, are described. Compiles a list of items that should be watched if the equipment is to do its part in conserving metals and manufacturing man-hours.

★ ★ ★

CEMENT HANDLING ON THE JOB—Blaw-Knox Division of Blaw-Knox Co., Allegheny County, Penna. (30 pp., illustrated.) Loose-leaf booklet describes in adequate detail the erection, operation, adjustment lubrication, maintenance and dismantling of portable bulk cement plant. Gives complete directions for accomplishing each step in setting up and operating both the 30- and 50-ton per hr. cement elevators and adjuncts.

★ ★ ★

Equipment

Distributors Sponsor

Army Engineer Repair Unit

AT THE REQUEST of the Corps of Engineers of the War Department, the Associated Equipment Distributors is sponsoring an affiliated Engineer Unit to be composed largely of men from the ranks of the construction and construction equipment industries. This unit is being organized for heavy-duty maintenance and repair work, including major overhaul, rebuilding and reconditioning of all types of engineer equipment, such as tractors, angledozers, power shovels, air compressors and pneumatic tools, electric generators, graders, mixers, fixed and floating bridges, outboard motors, search lights and surveying instruments.

Eligibility and Compensation

Men from 18 to 45 are eligible with
(Continued on Page 110)

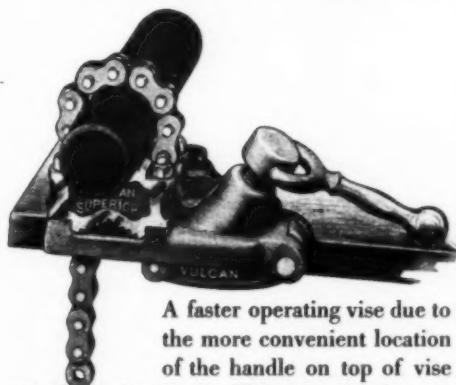
HOW AND WHY WILLIAMS' TOOLS AID WAR PRODUCTION

J. H. WILLIAMS & CO., Drop-Forgings and Drop-Forged Tools, BUFFALO, N. Y.

DATA ON "VULCAN" CHAIN PIPE VISES

● Williams' "Vulcan" Chain Pipe Vises are available in two basic types: "Vulcan Superior", with adjusting handle on top, and "Vulcan", of conventional design with handle below. In addition, the "Vulcan" Clamp Kit Vise provides a portable tool which may be quickly attached to bench, truck platform, post or other support on the job. Williams' line also includes the "Vulcan" Vise Stand—a complete unit combining Vise, Stand and Pipe Bender. A description of the construction and utility features of these Vises is given here to facilitate selection of the most efficient type for any specific service.

"VULCAN SUPERIOR"



A faster operating vise due to the more convenient location of the handle on top of vise and above the bench. This vise also has reversible jaws, which double the service life of the tool. It has 1/2" larger capacity than other chain vise of corresponding size. Made entirely of tough wrought steel with drop-forged base, jaws, handle and chain arm. Two sizes, for pipe 1/8" to 4 1/2".



The convenient location of "Vulcan Superior's" handle, "above the bench," is a great timesaver.

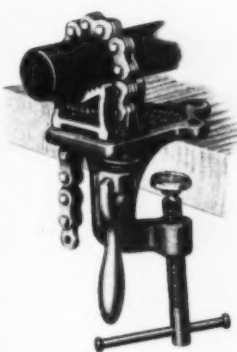
"VULCAN"



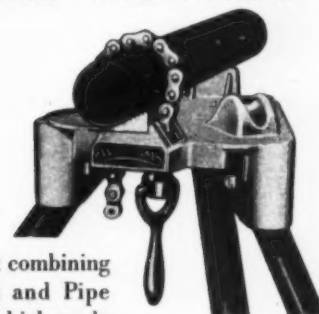
The original chain pipe vise and a favorite with pipe workers for more than thirty years. A light, compact, positive-gripping tool suitable for a wide variety of pipe work. Made entirely of wrought steel the same as "Vulcan Superior". Available in four sizes, for pipe 1/8" to 8".

"VULCAN" CLAMP KIT VISES

Extreme portability is a feature of this vise which weighs only 5-3/4 lbs. Can be carried to job in tool kit and quickly secured to bench, truck platform, post or other support without use of bolts or screws. The efficient clamping device is integral with the malleable iron base. The drop-forged jaws, nut and handle, and the chain are interchangeable with similar parts of "Vulcan" Vise, No. 1. Made in one size only, for pipe 1/8" to 2".



"VULCAN" VISE STANDS



A 3-in-1 unit combining Vise, Stand and Pipe Bender. The high-grade malleable iron base, designed for severe service, is equipped with oil can recess, tool slots, and rear pipe support. The Pipe Bender handles pipe up to 3/4". For easy carrying, legs fold and secure with tie chain. Vise parts are interchangeable with "Vulcan" No. 1. Made in one size only, for pipe 1/8" to 2".

WILLIAMS
SUPERIOR DROP-FORGED TOOLS
Headquarters
for over half a century for
DROP-FORGINGS and DROP-FORGED TOOLS

Sold by Leading Industrial Distributors Everywhere

WRENCHES
OF ALL
TYPES



TOOL HOLDERS



"C" CLAMPS



LATHE DOGS



PIPE VISES



PIPE TONGS



THUMB NUTS &
SCREWS



HOIST HOOKS



EYE BOLTS



Are You using

THESE

PRACTICAL HELPS IN YOUR PLANT TO CONSERVE THE AVAILABLE SUPPLY OF PROTECTIVE HATS ?



● Available through your M.S.A. field representative, these effective aids to protective hat conservation can reach *your* men—with an urgent appeal to cooperate in the War Production Board's national conservation program, furnished at no cost to you.

Protective hats use materials that must be *conserved*. Do your part, and let us help you!

MINE SAFETY APPLIANCES COMPANY
BRADDOCK, THOMAS and MEADE STREETS, PITTSBURGH PA.

District Representatives in Principal Cities

(Continued from page 108)

pay ranging from \$50 a month for privates to \$138 per month for master sergeants. The AED Recruiting Committee is composed of vice-president Ed. P. Phillips, Phillips Machinery Co., Richmond, Va., chairman; W. W. Bucher, R. E. Brooks Co., New York City; James C. Alban, Alban Tractor Co., Baltimore, Md.; S. John Oechsle, Metalweld, Inc., Phila., Pa., and S. Merrill Bemiss, Bemiss Equipment Corp., Richmond, Va.—all AED members.

Recruiting of personnel for this Engineer Unit will be confined for the time being to the Second Service Command covering the States of New York, New Jersey, and Delaware, and the Third Service Command covering the States of Virginia, Pennsylvania and Maryland. The District of Columbia is also included in the recruiting area.

Applications must be submitted on "Application for Enlistment" forms and filled out completely. All applications should be mailed to: The Recruiting Committee, Associated Equipment Distributors, National Press Building, Washington, D. C. at once. Enlistment will be for the duration of the war and 6 months thereafter.

★ ★ ★

New Technique

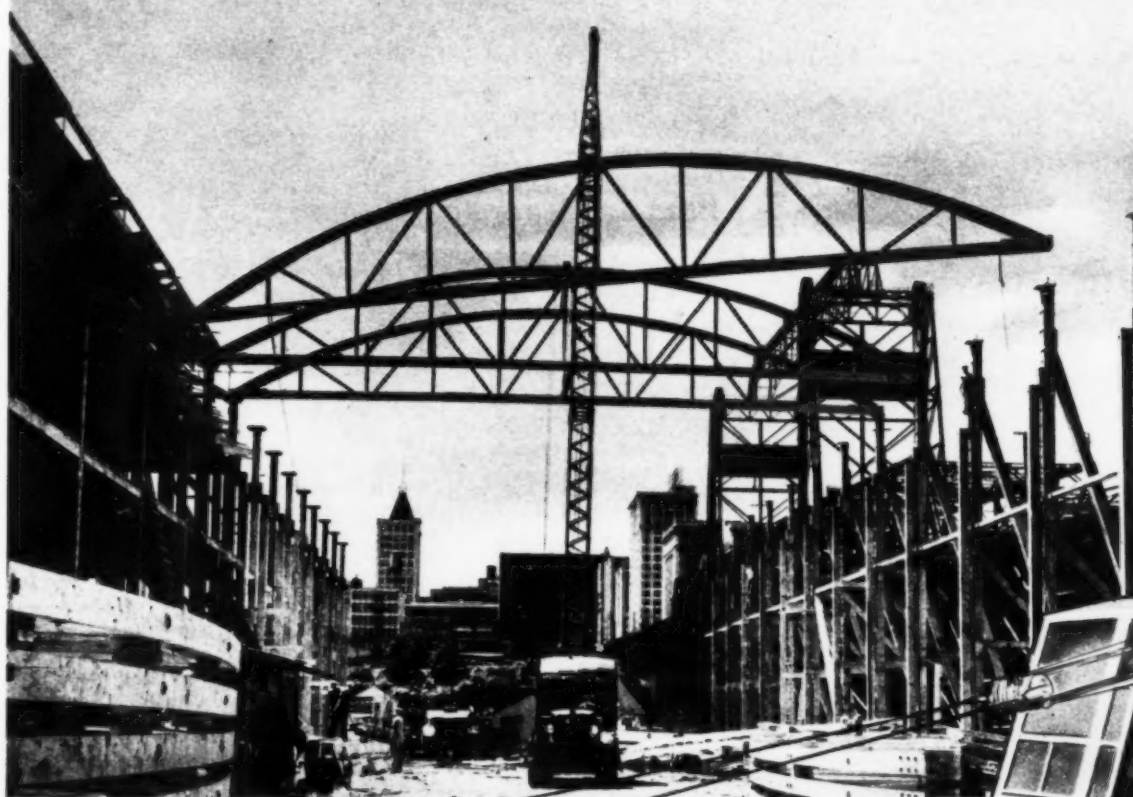
Speeds

Fillet Welding

IMPROVED METHODS OF WELDING horizontal fillets and fillets positioned for down-hand welding make it possible to increase welding speed as much as 100 percent over conventional procedure, according to information from the Lincoln Electric Co., Cleveland, Ohio, describing its new Fleet-Fillet technique. By using recommended electrodes of shielded-arc type, holding the electrodes at an angle different from the conventional position, stepping up the rate of electrode travel and employing generally higher currents, an operator can greatly increase production of fillet welds. Welds so made are said to contain less deposited metal but possess strength equal or superior to heavier fillets welded by ordinary methods. Deeper penetration at the corner of the weld into the parent metal of the two plates being joined increases the depth of the effective throat of the weld and produces high strength with less weld metal.

Successful application of the new
(Continued on page 112)

MOBILITY ... SPEED ... ENDURANCE



Northwest Hauling Company's MICHIGAN Mobile CRANE, equipped with 75' boom, setting prefabricated wooden trusses in new plant of west coast ship yard. Trusses are 90' long, 15' deep, weigh 3 tons.



MICHIGAN Mobile CRANES

Shipyards throughout the country employ MICHIGAN Mobile CRANES in huge yard-expansion and shipbuilding programs. MICHIGAN mobility, speed and endurance contribute to fast erection of war-plants, power lines pipe lines and countless other vital facilities.

These Air-Controlled MICHIGAN Mobile CRANES (3 to 12 ton capacities) may be im-

portant to the success of your future peace time program as well as to your present war-effort. Our engineering staff can offer valuable suggestions and cooperation in helping you solve your problems. Bulletin CM 102 contains complete information. Write for your copy today.

MICHIGAN POWER SHOVEL CO., Benton Harbor, Michigan, U. S. A.

MICHIGAN

AIR CONTROLLED

SHOVELS - CRANES - CLAMS

DRAGLINES - TRENCH HOES

Sonotube

From
Footings
to Sills

CONCRETE
PIER
FORMS

in
4 QUICK STEPS



FIGURED

The pier heights above footings for an entire building are figured at one time and turned over to sawyer.



CUT

Sonotubes arrive on job up to 24' long—light, easy to handle—placed in cradle and cut with hand saw to proper lengths. (Laminated fibre easy to cut).



SET

Placed in position and aligned on footings. Minimum bracing for tall piers (up to 10 ft.) Backfilling sufficient for short piers.

POURED

Sill braces set, and troweled off—piers are soon ready for sills. No stripping is necessary. Wax treated forms will slough off eventually.

Approved ARMY - NAVY - PBA - FHA

Immediate Delivery

5 STANDARD SIZES

9	10	11 1/4	12	13 1/2	Inside Diam.
64	78.54	100	113.1	144	Square Inches

Write for delivered prices

SONOCO PRODUCTS COMPANY

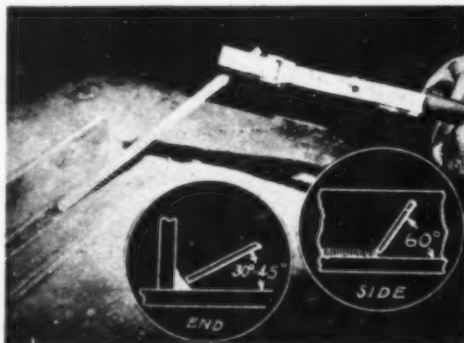
HARTSVILLE, S. C. MYSTIC, CONN.

ROCKINGHAM, N. C. GARWOOD, N. J. LOWELL, MASS.

(Continued from page 110)

technique depends on all the factors mentioned in the preceding paragraph, but the fundamental principle consists in holding the electrode at the proper angle. Accompanying illustrations provide a comparison of the angles at which electrodes are held under both the conventional and the new procedures.

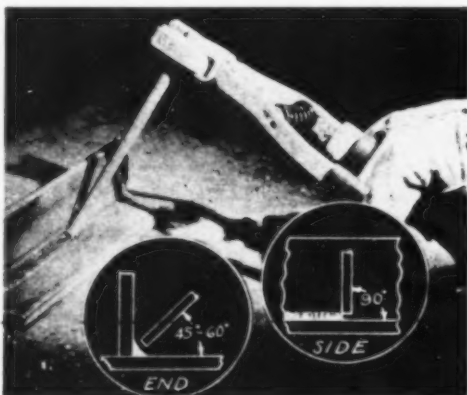
In conventional welding practice, the



IN CONVENTIONAL FILLET WELDING, operator holds electrode at angle of 30 to 45 deg. with horizontal plate and at about 60 deg. with line of weld.

electrode is held at about 45 deg. with the horizontal plate and at about 60 deg. with the line of the weld, with the end pointing backward. The arc is kept short, but the travel speed generally is so slow that the electrode must be held out from the two plates to keep the end of the electrode from dipping into the molten pool.

According to the Fleet-Fillet technique, the average position of the electrode is at about 90 deg. with the line of the weld and at 45 to 60 deg. with the horizontal plate. The arc is so short that the coating on the electrode practi-



FOR FASTER WELDING by Fleet-Fillet technique, electrode is held at 45 to 60 deg. with horizontal plate and at about 90 deg. with line of weld.

cally touches the plate. Lightly resting the coating against both plates is not objectionable. If the coating is forced against the plates, a rough bead is likely to result.

In making multiple-pass fillet welds by the new technique, beads are laid from the bottom upward to provide flat

(Continued on page 113)



● Here's the one-man MALL Electric Geared Head Vibrator that is saving man hours, time and materials on War Construction jobs.

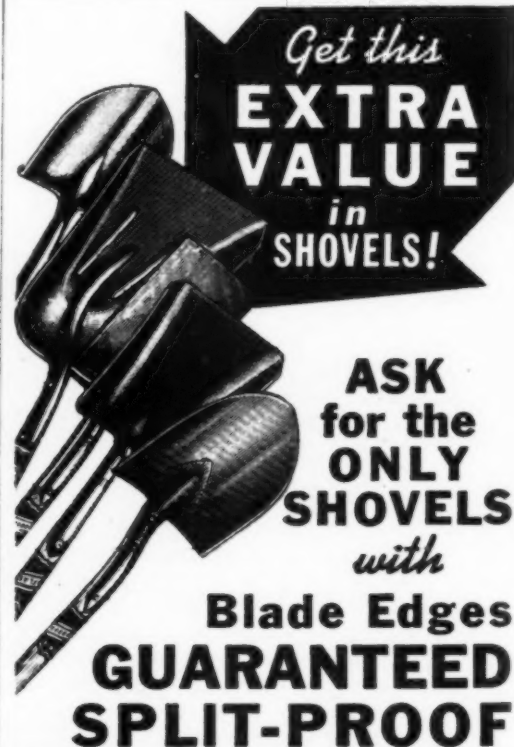
This big capacity unit is recommended for placing large masses of low-water-cement-ratio concrete for dams, locks, piers and other heavy construction. Operates 2 3/4" diameter concrete vibrating element. It is easily carried by one man anywhere on the job and provides super-power for every application. Other gasoline-powered, electric and pneumatic units 1 1/2 H.P. to 3 H.P. are available for War Construction.

Write, wire or phone for full details.

★ ★ THROW YOUR SCRAP INTO THE FIGHT

MALL TOOL COMPANY

7757 South Chicago Ave., Chicago, Illinois



INGERSOLL SHOVELS
"The Borg-Warner Line"

Write for Catalog and Prices
INGERSOLL STEEL & DISC DIVISION
BORG WARNER CORPORATION
NEW CASTLE, INDIANA

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WHERE GOING IS Tough GATKE High-Heat-Resisting Asbestos BRAKE MATERIALS Stand Out

GATKE Brake Blocks and Frictions — Moulded to machined accuracy in ALL shapes and sizes — LARGE or small.

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Brake Lining
Clutch Facings
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Non-Metallic
Bearings
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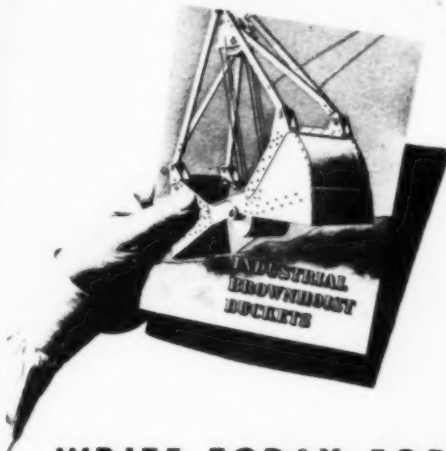
GATKE High-Heat-Resisting Brake Materials take more punishment because they are made for tough service — using materials and processes developed thru 28 years of specialization.

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Just off the press is this two-color, twenty-four page catalog packed with the facts you'll want to know about buckets. Which bucket is best suited to the job and what each type (rope-reels, power-wheel, special-purpose, open-type grab and link-type) will do is clearly explained by word, chart and photograph. If you haven't received your copy, write for it today.

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horizontal surfaces upon which to place succeeding beads, permitting higher currents and faster welding. The slag is left on the bead to provide a dam which will keep the metal from running off while the next bead is being laid. Slag is not removed until a layer of beads has been completed. The new technique of building up a multiple-pass horizontal fillet reverses the procedure of the conventional method by which the beads are laid from the top downward.

Data released by the Lincoln Electric Co. indicate that for single fillet welds the improved technique permits increases in welding speed up to 100 percent over conventional procedure, provided higher currents and recommended electrodes are used in the proper manner. Smaller speed increases are reported for the new procedure when it is applied with currents no higher than those ordinarily used in welding by the conventional method.

★ ★ ★

Refrigeration

Produces Sticky-Day

Concrete

Curing Tests

IN THE FLOOD OF DEFENSE ORDERS, materials must meet rigid specification, and the work of testing laboratories becomes increasingly important. Refrigeration is playing a big part in helping to



CHECKING OF SAMPLES in air-conditioned curing room is being done by Frank Lak (left), supervisor of concrete testing section, Pittsburgh Testing Laboratory, Pittsburgh, Pa. Note two special cooling coils suspended from ceiling.

create test conditions, its role being usually associated with sub-zero, or at least sub-freezing, temperatures.

In the curing room of the concrete testing section of the Pittsburgh Test-

(Continued on page 114)

**You should carry
one of these
LUFKIN TAPE-RULES**



If you ever acquire the habit of carrying a tape-rule, you'll wonder why you waited so long to get it. They're as handy as a watch to carry — and as useful, too. Your dealer will help you select the one best suited to your needs. May we send you a free copy of our new Catalog?

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TAPES • RULES • PRECISION TOOLS

... If you want to make speed
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EQUIPMENT** ... Buy the Fast ...

JACKSON Hydraulic Concrete Vibrator

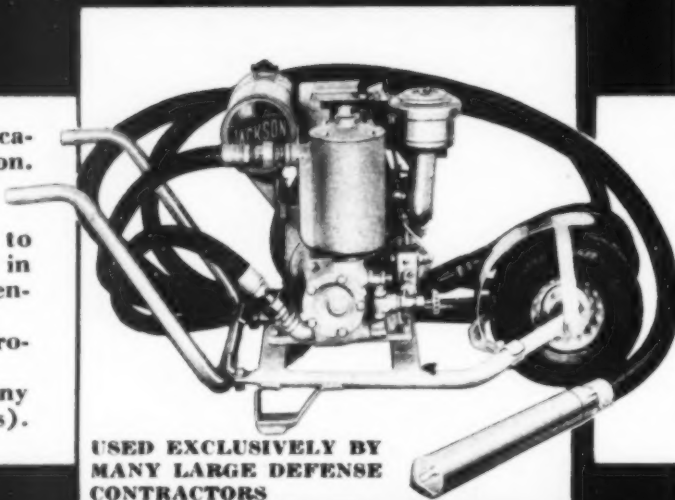
DESIGNED TO "TAKE IT" 3 SHIFTS A DAY—EVERY DAY

Automatic pressure lubrication—requires no attention. 34-ft. hose—2 3/4" vibrator head.

Adjustable frequency to 6800 R.P.M.—submerged in concrete. Powerful gas engine—4.7 H.P.

Long lived, ball-bearing, rotary, hydraulic pump.

(Used exclusively by many large defense contractors).



USED EXCLUSIVELY BY
MANY LARGE DEFENSE
CONTRACTORS

ELECTRIC TAMPER & EQUIPMENT CO.

LUDINGTON, MICHIGAN

**We've got to win the
"battle of construction," too**

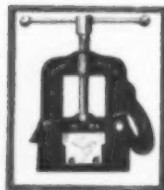
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DROP-FORGED FOR EXTRA STRENGTH and SAFETY

will help you keep ahead of schedule—with less possibility of accident to your workmen.

All of the TRIMO tools are made strictly to Federal Specifications covering tools of their particular type.

Your supply house has them



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**TOOLS ARE VITAL TO OUR WAR EFFORT
USE THEM PROPERLY—KEEP THEM IN REPAIR**

**MADE AND GUARANTEED BY
TRIMONT MFG. CO., (ROXBURY) BOSTON, MASS., U.S.A.**

MAKERS OF QUALITY TOOLS FOR OVER FIFTY YEARS



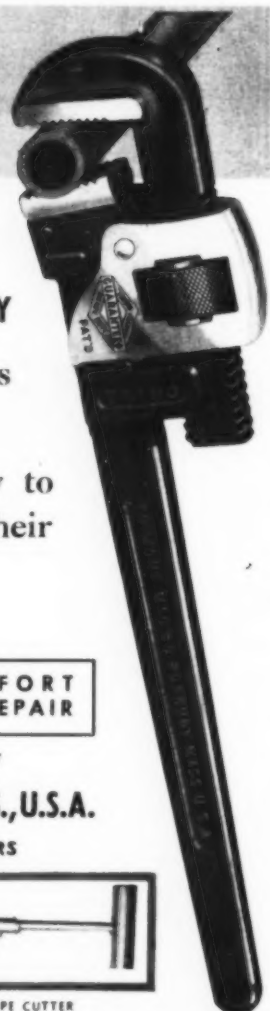
TRIMO TUBE CUTTER



TRIMO MONKEY WRENCH



TRIMO PIPE CUTTER

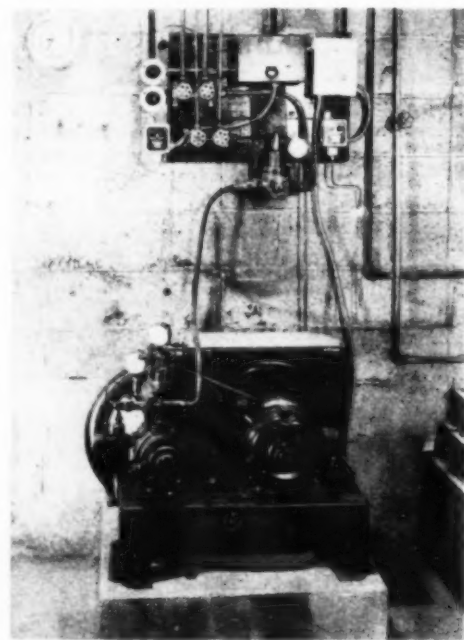


(Continued from page 113)

ing Laboratory, Pittsburgh, Pa., however, refrigeration helps to maintain an atmosphere like that of a very sticky day in June. In this room, where concrete cylinders and building blocks are cured for periods ranging anywhere from 7 to 28 days prior to being tested for quality, strength, and durability, it has been necessary to maintain the temperature at 70 deg. F., +or-3 deg. and the humidity at never less than 90 percent.

Temperature and Humidity Controls

Brown Bricker, commercial refrigeration dealer of Pittsburgh, turned the trick with the following equipment. Two General Electric conditioned-air cooling units, each equipped with a 500-watt Calrod heating unit located in front of the blower, provide both cooling and heating. The room temperature is controlled by two thermostatic controls arranged so that the heaters will cut in when the temperature drops, and the cooling will cut in when the temperature rises. A slow-speed 1-hp. G-E condensing unit, equipped with a Hubbell pressure regulating valve to maintain a high-back pressure, supplies the cool-



CONDENSING UNIT. 1-hp. capacity, with temperature control and pressure regulating valve, provides cooling in curing room.

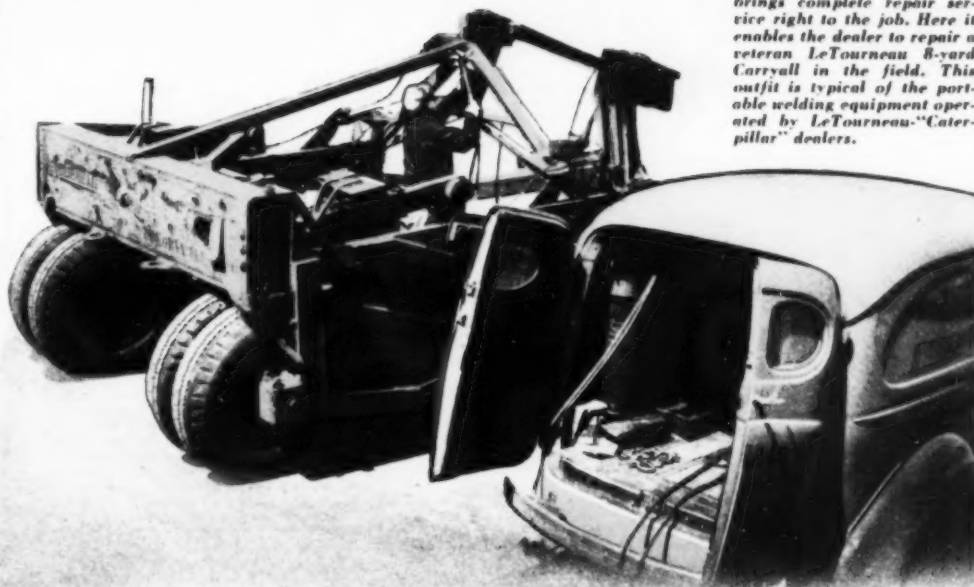
ing coils. The unit is operated on a 10-deg. temperature difference to keep condensation at a minimum. Humidity is maintained by a special spray nozzle located in front of the heater and blower.

Maintains Required Temperature

A 7-day recording instrument reveals that this equipment keeps the temperature in the curing room within 1 deg. of the required temperature and maintains an average relative humidity of 94 percent. This is well within the limits set by the American Society for Testing Materials, the U. S. Navy, U. S. Army,

(Continued on page 116)

What service facilities have LeTourneau-"Caterpillar" distributors for repairing and maintaining your construction equipment? To get the answer, we recently made a thorough service survey of the 102 LeTourneau-"Caterpillar" dealers in the U. S. and Canada. We're proud of our dealers' service organization, but the results surprised even us. Here's what the survey showed:



This Tournacar Welder brings complete repair service right to the job. Here it enables the dealer to repair a veteran LeTourneau 8-yard Carryall in the field. This outfit is typical of the portable welding equipment operated by LeTourneau-"Caterpillar" dealers.

LeTourneau-"Caterpillar" Dealers Average 12 Expert Servicemen Each.

Many of these have factory training. Both LeTourneau and "Caterpillar" provide traveling training schools to keep these men abreast of the latest and best service methods.

101 of the dealers employ skilled welders. All but two have shop welding units. In addition, 80% have portable welding outfits, capable of getting to your job quickly to make in-the-field repairs.

Large Parts Stocks

The average stock of LeTourneau repair parts carried was \$10,809. That means in most cases your dealer can furnish parts direct from stock.

No other dealer organization, we feel sure, is so well equipped to service and repair construction equipment. No matter where today's wartime jobs take you, you will find a LeTourneau-"Caterpillar" dealer near. Take advantage NOW of his time-saving parts and maintenance service — make him your Victory Construction Headquarters.

Breaking In New Operators? LeTourneau Instruction Books Can Help You — They're FREE

Help your new operators and yourself by giving them good instruction books. LeTourneau Instruction Books contain complete, illustrated, easy-to-understand information on both operation and servicing. For example, the Carryall Scraper book, in addition to routine operating procedures and adjustments, includes a wealth of practical suggestions for opening cuts and fills, maintaining slopes, reducing cycle time, pusher loading, tandem operation and the handling of special materials and situations. Like all LeTourneau In-

struction Books, it's prepared, under the supervision of practical Field Servicemen, to make the job of your operators and mechanics easier.

An instruction book accompanies each LeTourneau machine delivered, but it's easy to lose them. If yours are lost, we'll gladly furnish new ones. Here's a list of those available:

Carryall Scrapers
Power Control Units
Dozers
Rooters
Cranes
Sheep's Foot Rollers
C and Super C Tournapulls
Tournacar Welders

Just write, giving us your name and address and book wanted.

Make Equipment Last Longer and Do More, That's Co-Operator Purpose

The Co-Operator is published 10 times yearly. Written in "on-the-job" language, it's packed with helpful, worthwhile dope for operators, servicemen, superintendents, engineers, owners — anyone who works with LeTourneau equipment. It contains ideas from operators and servicemen all over the world, who have found new ways to move more dirt or make equipment last longer and who want to pass along their experiences.

Both new and old operators and servicemen will get help from the Co-Operator. We'll gladly send you copies for all your men. It's free. Write for yourself and men today.

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Gentlemen: Please send me.....copies of the Co-Operator each time it is issued. Also send me the following instruction books.

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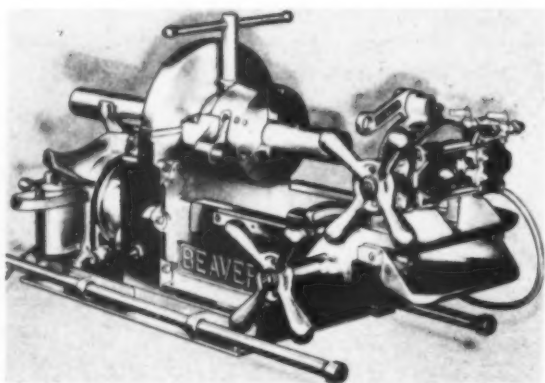


Manufacturers of DOZERS, CARRYALL SCRAPERS, POWER CONTROL UNITS, ROOTERS, SHEEP'S FOOT ROLLERS, TOURNAPULLS, TOURNAROPS, TOURNATRAILERS, TOURNAWELDS, TRACTOR CRANES.

Name Reg. U. S. Pat. Off.

The A-B-C of Pipe and Bolt Machines

From \$135 up!



Beaver Model-A

A high-speed heavy-duty deluxe pipe and bolt machine, complete in every detail and admitted leader in its field. Will cut, thread and ream 1/4 to 2-inch pipe and, with drive shaft and geared tools, will cut and thread 2 1/2 to 12-inch pipe. Threads bolts 1/4 to 2-inch; cuts-off bolts (wheel cutter) up to 7/8-inch. New high speed model outperforms all competition. Right-handed — like a lathe. More than 50% greater open working space. All controls in front. Wheel or knife cutoff. Standard geared chuck with automatic safety wrench ejector. Safety shear pin. Ring-type opening adjustable dieheads—no hinge. Die segments adjust simultaneously as a unit. Choice 110 or 220 volt universal reversible motor. Automatic gear-driven oil pump. Easily portable when mounted on stand with 17-inch wheels. Weight approximately 415 lbs.

\$344.50 up

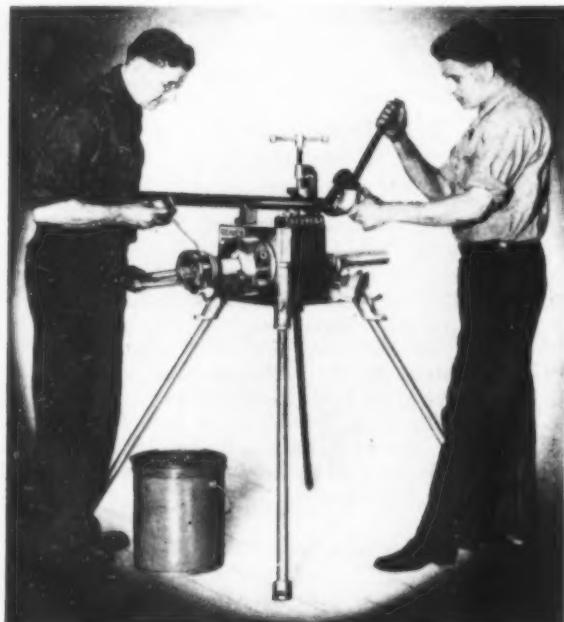
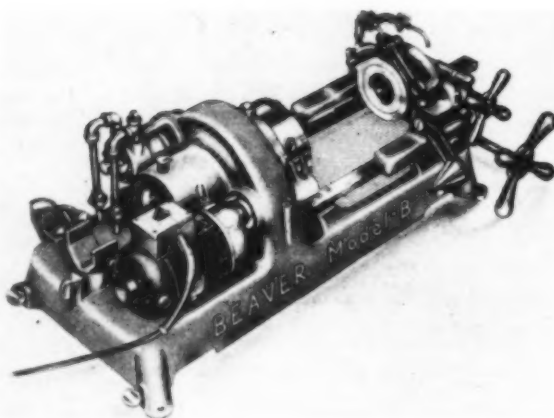
Write for Bulletin A & What Users Say

Beaver Model-B

Beaver Model-B is a highly efficient 1/4 to 2" low-priced portable utility machine embodying many advanced features heretofore available only on higher priced machines. Complete range 1/4 to 1/2-inch pipe; 1/4 to 1 1/2-inch bolts. Rack-and-pinion feed; 60% more power; one-piece cast steel-iron base and cap—no flimsy sheet metal housing; sockets for pipe legs to form inexpensive but sturdy stand; all-steel geared universal 1/4 to 2-inch chuck—with safety automatic chuck wrench ejector; hinged full-range reamer; sliding wheel or knife cutoff; ring-type opening adjustable dieheads—no hinge. Automatic gear-driven oil pump or one-gallon oil reservoir optional. Adequate motor ventilation. Choice of 110 or 220 volt universal reversible motor. Easily portable when mounted on stand with 17-inch wheels. Used by such firms as Fisher Body; Du Pont; Bethlehem Steel; J. & L. Steel; scores of defense contracts, etc. Weight approximately 280 lbs.

\$264.50 up

Write for Bulletin B & What Users Say



Beaver Model-C

Convert your present hand pipe tools into electric tools to cut, thread and ream 1/4 to 2-inch pipe. With drive shaft and geared tools 2 1/2 to 8-inch pipe may be cut and threaded. Bolts up to 1 1/2-inch size. Has ample power to allow for dull dies and low line voltage. Choice of 110 or 220 volt universal reversible motor. Now equipped with automatic chuck wrench ejector and safety latch — to protect machine and workman. Equipped with legs, vise and bender, as illustrated, the Beaver Model-C becomes a complete portable electric pipe shop. Model C-1 is furnished without vise; Model C-2 is supplied with vise. Set of Legs and Fittings, \$5.50. Bender, \$1.50.

\$135.00 up

Write for Bulletin C & What Users Say

Write for complete Catalog of Beaver Pipe Tools (Hand and Power) — Cutters — Threaders — Reamers — Beveling and Grooving Tools, Pipe and Bolt Machines.

BEAVER PIPE TOOLS

1100 DUFF AVE. Quality Tools — Since 1900 WARREN, OHIO

(Continued from page 114)

American Association of State Highway Officials and Federal specifications for testing of Portland and masonry cements, fine aggregates for concrete, tests of concrete cylinders cured under laboratory conditions, soundness tests of building stone, and concrete aggregates by sodium and magnesium sulphate methods.

The curing room in the Pittsburgh Testing Laboratory can hold as many as 1,200 samples and of late it has very often been filled to capacity. The Laboratory has testing machines ranging in capacity from 2,000 lb. full load to 6,000 lb., a machine for torsion tests of 60,000 in./lb. capacity, and equipment for determining coefficient of expansion from very low temperatures on up to 1,500 deg. F.

★ ★ ★

Pitfalls in Bidding

Address at meeting of American Road Builders' Association by Walter C. Sadler, Professor of Civil Engineering, University of Michigan, and Mayor, Ann Arbor, Mich.

Continued from page 88, August Issue of
CONSTRUCTION METHODS

Supervisory Engineers and Public Officials

There is a basic rule in the field of agency that the principal is liable for the act of his agent. The application of this rule is extended to include those unauthorized acts of the agent which are necessarily implied as an incident to the contract itself, and also to those unauthorized acts wherein the agent had the apparent authority of the principal. General contractors may be confronted with these types of problems in the purchase of equipment and supplies. There is, however, another branch of this law involving more difficult and certainly more troublesome features. Consider the situation where a contract calls for the handling of grading material in a certain manner. As the work progresses it may become evident that a change in the plans would prove a distinct saving to either the client or the contractor. Verbal agreements for changing the contract in the field between the contractor's superintendent and the engineering representative of the client are extremely dangerous and of decidedly doubtful legal standing.

An early case in the state of Vermont involved the construction of a grading job

KEEP THAT SCRAP MOVING!

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LINK-BELT SPEEDER

SHOVELS—DRAGLINES
CRANES



America needs Scrap

*Throw Your
Scrap into
the FIGHT!*

... and moving it is when Link-Belt Speeder clamshells or magnet cranes tackle the job. Fast, efficient and powerful, these cranes handle chunks and masses of scrap metal in yards all over the country—feeding gigantic baling machines. These cranes help to keep the steel furnaces going by speedily handling huge quantities of vital scrap.

Yes, American steel plants are hungrier than they have ever been before. Blast furnaces all over the Nation are roaring night and day—producing steel for ships, tanks and guns. **MORE** and **MORE** scrap metal is desperately needed—storage piles are getting low. Let's keep those steel mills rolling by bringing in the scrap for Victory. It's up to every single one of us.

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LINK-BELT SPEEDER CORPORATION

Builders of the Most Complete Line of Shovels and Cranes

301 WEST PERSHING ROAD

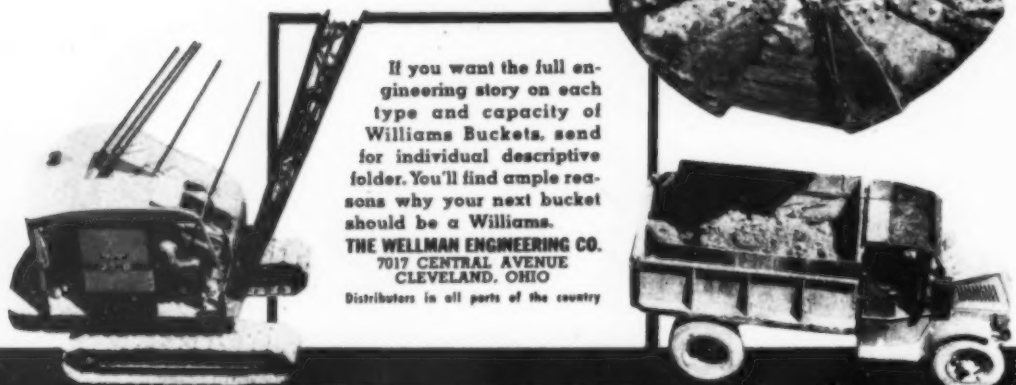
CHICAGO, ILLINOIS

WELDED

ROLLED STEEL CONSTRUCTION

FOR GREATER STRENGTH AND SPEED

An operator really makes time with a Williams Bucket on the end of his boom. A few grabs and another full loaded truck is on its way. Williams Buckets have tremendous closing power—they dig deep—bite clean and come up with heaping loads. Williams Buckets are "built to last and move dirt fast". And that's exactly what a contractor wants—long service at little maintenance cost, and fast, dependable action when moving yardage spells profits.

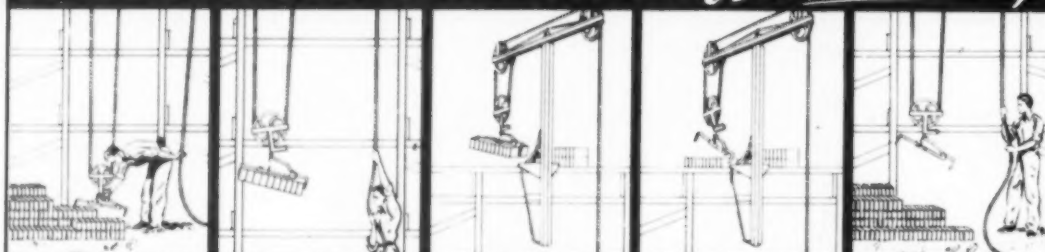


If you want the full engineering story on each type and capacity of Williams Buckets, send for individual descriptive folder. You'll find ample reasons why your next bucket should be a Williams.
THE WELLMAN ENGINEERING CO.
7017 CENTRAL AVENUE
CLEVELAND, OHIO
Distributors in all parts of the country

WILLIAMS Buckets

built by WELLMAN

New CLIPPER HOISTS Unload Automatically



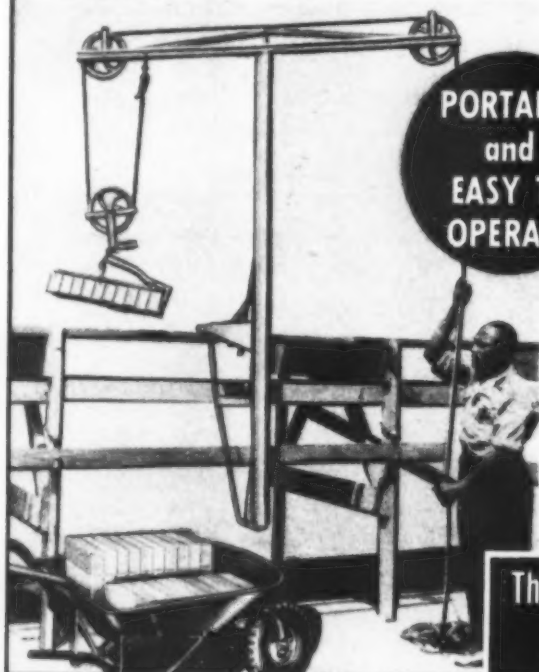
ONE MAN LOADS

LIGHTER AND EASIER

PIVOTS TO POSITION

AUTOMATICALLY UNLOADS

HANDLES ALL MATERIALS



**PORTABLE
and
EASY TO
OPERATE**

You'll want Clipper Hoists on your jobs.

Lightweight and quickly set up ready for use, the Clipper Hoist is operated by only one man!

One man from his position on the ground, can load the material, lift, and then automatically unload directly on the scaffold.

FASTER—Brick, tile, concrete and flue lining can be hoisted to greater heights, without fatigue.

FLEXIBLE—Practical for every job. Chimneys, Public and Industrial construction, or repair work.

Write for complete literature.

The CLIPPER MANUFACTURING COMPANY

ST. LOUIS, MISSOURI

District Offices and Warehouses

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Kansas City

Austin, Texas

(Continued from page 116)

on the Vermont Central Railroad, wherein the resident engineer authorized a substantial change in the grading contract. He directed the contractor to move waste excavation material to a distant fill and promised to make payment through the normal overhaul classification of the contract. The ensuing litigation never turned on the merits or the expediency of the altered contract, but was decided against the contractor on the narrow but effective grounds that no agent (in this case a resident engineer) has the authority to write a new contract. Modern contractors are quite appreciative of these basic facts and yet we still find litigation today involving large sums of money hinging upon this identical point.

Dangers of Illegal Contracts

The very orderly procedure in letting general contracts under federal government and state highway department supervision may preclude incipient litigation of the following type. However, over-enthusiastic contractors trying to close up jobs with county road commissioners, township supervisors, or common councils of small cities, may easily jeopardize their entire agreement by proceeding on an illegal contract. As you fully appreciate, the law is most severe in its limitation upon the authority of public officials. A contractor relying upon the unauthorized act of a public official positively does so at his own peril. For instance, more than sixty years ago a contractor by the name of McDonald spread gravel surfacing on one of the streets here in New York City, upon the personal authorization of the superintendent of streets. The law required that such a job could be contracted for through sealed bids, resolution of the common council, or certain emergency powers of the superintendent of streets. The McDonald contract met none of these requirements, and the job has never been paid for to this day.

Litigation on U.S. Contract

Another case is of a contractor who failed to put in piling of that length required by the contract for the construction of a dry dock for the United States Navy. The Navy had an inspector on the job throughout the work, and he approved the work as done. A board of Navy Department engineers, of the highest rank, inspected the work upon completion and accepted the same for the United States Government. Later the dry dock settled and ceased to be water-tight, with the result that a general reconstruction of the entire work was found to be necessary, at an added expenditure of \$171,360. In an action for recovery of this large sum of money, the United States maintained that the work was not done according to contract. The contractor set up the defense that this work had been inspected and approved by all representatives of the United States Navy and that such action should be binding upon the United States Government. While a district court decided in favor of the contractor, the circuit court

(Continued on page 120)

HELP

...To Keep 'Em Rolling... Longer

SHELL TALPEX

HERE'S FIRST AID for hard-working engines . . . a new, all-purpose, heavy-duty lubricant that can take peak-load pulls in its stride and still retain its ace-high lubricating qualities.

Here's why. Shell Talpex Oil has:

1. **HIGH DETERGENCY.** Helps keep carbon, lacquer and foreign particles from adhering to pistons and rings, valves, ports.
2. **EXCEPTIONAL OXIDATION STABILITY.** Minimum of sludge, lacquer and other deterioration products in cylinder and crankcase. Engine stays in clean condition.
3. **NON-CORROSIVENESS TO ALLOY BEARINGS.** Guards against corrosion of all lubricated engine parts.
4. **LOW CARBON FORMATION.** Reduces ring sticking and wear. Engine life is lengthened.

Are your engines getting this kind of protection? Don't guess . . . be sure. Call in the Shell man now and get the full details on Shell Talpex Oil.

***The New, All-Purpose,
Heavy-Duty Lubricant**

**FOR TRUCKS - BUSES
TRACTORS - SHOVELS
STATIONARY & MARINE DIESELS**

PASSENGER CAR USE PROHIBITED BY OPC
RECOMMENDATION NO. 40, AMENDMENT.





★ Picture shows Warrington-Vulcan Single Acting Pile Hammer driving reinforced concrete piles 20"x24"x72 feet long from floating derrick for harbor wall. The longest piles driven on this job were 93 feet long. Sizes, 0-1-2-3-4. The SUPER-VULCAN Differential-Acting Open-Type Pile Hammer fits the same leads and uses the same accessories as the Warrington-Vulcan. Sizes 80c, 50c, 30c, 18c.

Added speed in construction is vital today—get it with VULCAN—there are types and sizes for every need—for underwater work use Super-VULCAN Differential-Acting Closed-Type Steam Pile Hammers—for removing old piles of all kinds quickly, use the VULCAN Pile Extractor. We are the largest exclusive manufacturers of pile driving and extracting machinery since 1852. Write for bulletins.

VULCAN IRON WORKS

Since 1852

331 North Bell Avenue

Chicago Illinois

(Continued from page 118)

of appeals reversed the decision. It held that the employees of the United States Navy, irrespective of rank, had no authority to accept workmanship inferior to the requirements of the contract under which they were working.

These cases may seem extremely simple from the legal point of view, and they possibly are, but this type of litigation continues to find its way into the courts year after year and certainly is a matter which goes to the heart of the contract. Supervisory officials in construction companies should ever be alert to the basic legality of the contract itself.

Independent Contractor vs. Servant Relationship

Under the common law, the client has no liability for the negligent act of an independent contractor who does work for him, while there would be full liability if client's servant did that same work. The distinction between the two lies in the control. If the client has control, the independent contractor becomes a mere servant; while if the client merely specifies the result, the control lies wholly within the independent contractor. While it may be beyond the province of this paper to analyze this situation in detail, a very convincing argument can be developed to the effect that the general policy in drawing up a contract and specifications should relate to the object to be obtained, leaving the means and methods of doing the work to the contractor.

Let us examine the significance of this matter to the preparation of a bid. Consider for a moment a contract for the placing of asphaltic concrete, with most exacting details of temperature control, plus regulations as to mix and placing. Then on top of everything, there may be a requirement for 5-yr. guarantee of satisfactory service. A bidder may well examine the details of regulation and control to satisfy himself that they are not of such a nature as to jeopardize the accomplishment of the 5-yr. satisfactory service. And a very real factor may lie in the political angle, for the passage of 5 yr. can easily see that change of political control whereby some future self-seeking politician may press for personal advantage, by charging unsatisfactory service. The estimator should appreciate that these factors are all part of the picture.

A Strong Defense

Incidentally, if a contractor is faced with litigation for a breach on the 5-yr. guarantee, a strong defense may be set up in two ways. Establish by expert testimony that the design requirements of the specifications were responsible for the road failure, that it was impracticable to carry out the minute details of the specifications and insure a satisfactory result; and in short, that the contractor lost his characteristic of an independent contractor and became a mere servant in this matter, with no responsibility for the guarantee clause. Another strong defense might well turn on the changed traffic conditions incidental to

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AIR COMPRESSORS
MIXERS
GRADING MACHINES
SCARIFIERS
BULLDOZERS
SHOVELS . . . PAVERS
TAR TANK TRUCKS
BUCKET LOADERS
CRANES . . . HOISTS
TRACTORS
DUMP TRUCKS
ASPHALT SPREADERS

No other equipment gets harder use or greater abuse than construction or road building machinery. No other equipment requires such careful, thorough reconditioning and overhaul. Simplify this essential maintenance by FIRST cleaning equipment FASTER and EASIER the effective, low-cost Oakite way! This newly revised and enlarged 24-page manual tells how. Describes various successful methods for thoroughly, quickly removing oil, grease and muck. FREE on request. Write for YOUR copy today!

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CONSTRUCTION WORKERS WEAR **TOWER'S FISH BRAND** OILED WATERPROOF WORK CLOTHING

For Wet Weather Protection

With rubberized work clothing practically out for the duration, construction workers are turning to TOWER'S dependable oiled suits, coats and hats. Longwearing, dependable and practical in every detail they give the utmost in freedom of movement and wet weather protection. While our Government has first call on TOWER'S production, there is still a limited supply available for use by workers in essential industries. Ask your Dealer.

Write for folder CW—"PRESERVE YOUR SLICKER"



A. J. TOWER CO.

BOSTON, MASS.

FAMOUS FOR OVER 106 YEARS

the new road, which were so greatly increased as to be a heavily contributing factor in the ultimate failure; and since the contractor had no control over the same, nor had any way of anticipating them from the terms of the contract, he should not be held liable under the guarantee.

Raising Engineering Standards

The founder societies, such as the American Society of Civil Engineers, have tried to raise the standards of the engineering profession through their society codes of ethics and their personally sponsored state statutes for the required registration of designing engineers. I think that it is fortunate for the client that the design has been completely divorced from the contracting profession, and I also believe the engineering profession should be sufficiently skilled in its design, and have sufficient confidence in its ability in design and supervision of construction, so that it could completely eliminate these 5-yr. performance bonds. The estimator for the contractor should know the general philosophy of the law on these matters, and understand this legal significance of a set of contracts and specifications as he prepares his bid.

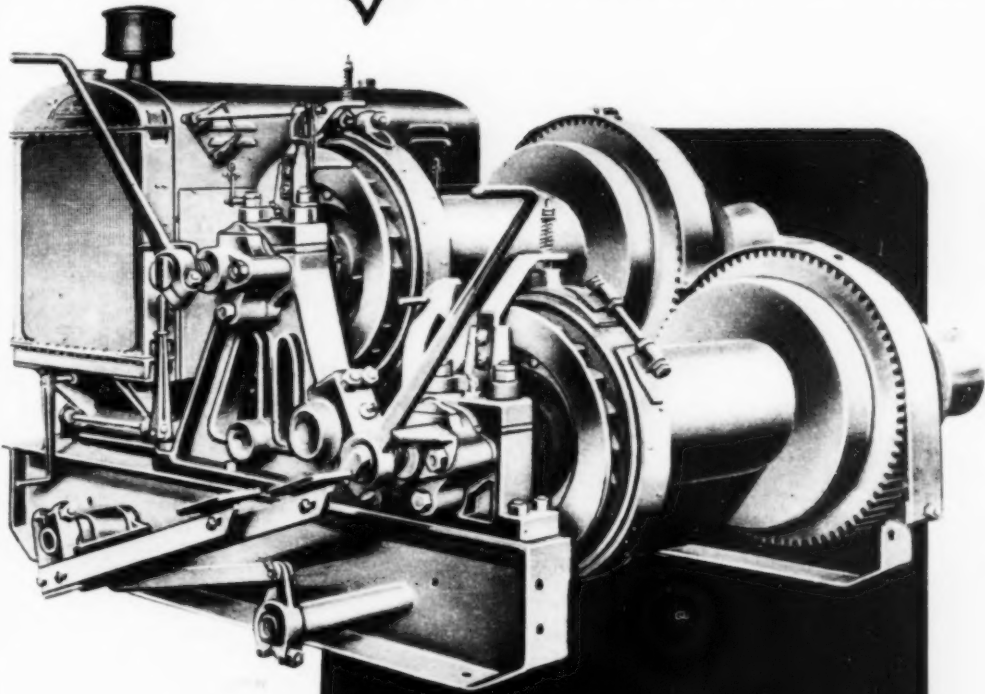
Arbitration

Many contracts contain arbitration clauses, which are so worded as to bind the parties on a contractual basis. These usually take one of the following two forms; first, "the engineer shall be the sole arbitrator and his decision in all matters of controversy shall be final." The second form may provide, "in all cases of controversy, a board of three arbitrators shall be established, each party appointing one member and these two selecting the third, submission and the subsequent validating of the award of the board to be performed by a court of appropriate jurisdiction." Speaking frankly, this first form indicates a cold and harsh attitude on the part of the client and his engineer; and the contractor's estimator should be very careful that the bid is properly planned and adjusted to cope with such conditions. This first type is clearly intended to place the interpretation of the contract within the control of one party, and that is a particularly vicious form of adjudication. In fact that type of reference may generally be broken on the legal grounds of usurping the rights of the courts, but this is expensive and irksome.

Contrasted with the above first plan, the parties may reduce their differences to writing and then submit the same to a court asking the court to approve their respective nominations for the board, and to direct the board to proceed to a decision. After the hearings have been held, and the deliberations are complete, the board should submit its sealed opinion to the court to obtain a court order directing that the award of the board be executed. This has a full legal status. A somewhat less formal procedure is available, where

(Continued on page 122)

CLYDES *give better service*



If you are fortunate enough to own a Clyde hoist, you know it is a husky machine built to give many years of top-notch performance. During these critical times extra care should be given it to help increase its efficiency and prolong its life.

Proper lubrication is very important to the life of any machine. A few minutes a day will reduce wear through friction and add years of service. If you do not have a lubrication bulletin that shows the proper lubricants and how to apply them, we will gladly send one.

Careful periodic adjustments of frictions, brakes and all wearing parts will also do much to give more efficient and satisfactory performance. Keep all bolts tight. Note parts subject to wear and replace, if necessary. Proper care of your hoist will keep it running.



CLYDE IRON WORKS, Inc.

DULUTH, MINN.



Moving suction mats which dewater 6 in. to 8 in. floor slab in 5 to 10 minutes, doubling 3-day strength of concrete and saving hours of finishing time.

Repeat Orders Prove Customer Satisfaction!

These nationally known contractors are using the VACUUM-CONCRETE process to dewater their concrete floor slabs on job after job. They know they can use more economical mixes, lay more floor more days, and slash finishing costs with VACUUM CONCRETE.

George A. Fuller Company, New York City, 4 Contracts, 3,460,000 sq. ft.

McCloskey & Company, Philadelphia, Pa., 11 Contracts, 5,722,000 sq. ft.

Chas. H. Tompkins Co., Washington, D. C., 3 Contracts, 906,000 sq. ft.

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Thos. O'Connor & Co., Boston, Mass., 3 Contracts, 810,000 sq. ft.

Wigton-Abbott Corp., Mahony Troast Construction Co., Bayonne, N. J., 3 Contracts, 1,838,000 sq. ft.

Turner Construction Co., New York City & Philadelphia, Pa., 3 Contracts, 1,305,000 sq. ft.

Rust Engineering Co., Pittsburgh, Pa., 3 Contracts, 1,352,000 sq. ft.
Brann & Stuart Co., Philadelphia, Pa., 3 Contracts, 9,094,000 sq. ft.

For greater SPEED and ECONOMY—to hold midsummer progress schedules all Winter and increase their year 'round profits.

Vacuum-dewatered concrete can be poured later, and finished earlier, at less cost. . . . Develops stripping strength in 3 days instead of 7. . . . Simplifies winter protection.

Write Dept. M for complete data

VACUUM CONCRETE, INC.

4210 SANSOM STREET, PHILADELPHIA, PA.



WILLIAMS

"SUPER-HI"

TENSILE TIE RODS

INEXPENSIVE U. S. STANDARD THREAD RODS

3/4" long thread, each end 1/4" diam. U. S.—20 thread 6,000 lbs. Ultimate Tensile 4,900 lbs. Working Load per Rod			3/4" long thread, each end 1/4" diam. U. S.—16 thread 5,500 lbs. Ultimate Tensile 7,500 lbs. Working Load per Rod			3/4" long thread, each end 1/2" diam. U. S.—13 thread 16,500 lbs. Ultimate Tensile 13,000 lbs. Working Load per Rod		
LENGTH of Rod	Price per 100 Rods	App. Wall Width	LENGTH of Rod	Price per 100 Rods	App. Wall Width	LENGTH of Rod	Price per 100 Rods	App. Wall Width
12" or less	\$2.00	15" or less	12" or less	\$3.00*	15" or less	12" or less	\$4.00*	15" or less
13"	2.17	16"	13"	3.25	16"	13"	4.33	16"
14"	2.33	17"	14"	3.50	17"	14"	4.67	17"
15"	2.50	18"	15"	3.75	18"	15"	5.00	18"
16"	2.67	19"	16"	4.00	19"	16"	5.43	19"
17"	2.83	20"	17"	4.25	20"	17"	5.67	20"
18"	3.00	21"	18"	4.50	21"	18"	6.00	21"
19"	3.17	22"	19"	4.75	22"	19"	6.33	22"
20"	3.33	23"	20"	5.00	23"	20"	6.67	23"
21"	3.50	24"	21"	5.25	24"	21"	7.00	24"
22"	3.67	25"	22"	5.50	25"	22"	7.33	25"
23"	3.83	26"	23"	5.75	26"	23"	7.67	26"
24"	4.00	27"	24"	6.00	27"	24"	8.00	27"
Price per add'l inch	\$0.015	Figure rods from 2" to 5" less than Wall for Vibra-Lock or nearest 3" multiple	Price per add'l inch	\$0.023	Figure rods from 2" to 5" less than Wall for Vibra-Lock or nearest 3" multiple	Price per add'l inch	\$0.033	Figure rods from 2" to 5" less than Wall for Vibra-Lock or nearest 3" multiple
Price per add'l foot	\$0.18		Price per add'l foot	\$0.276		Price per add'l foot	\$0.372	
Price per add'l 100 ft.	\$1.80		Price per add'l 100 ft.	\$2.76		Price per add'l 100 ft.	\$3.72	
Lengths over 20' 0" add for Williams High Tensile Couplings per 100	\$2.75		Lengths over 20' 0" add for Williams High Tensile Couplings per 100	\$3.75		Lengths over 20' 0" add for Williams High Tensile Couplings per 100	\$4.75	

* Rods under 12" in length knurled to prevent turning in concrete.

Immediate 24-Hour Service — PHONE 3-3823 Day or Night

(Wire or phone Collect on orders of \$100.00 or more)

Use Williams Form Clamps for Best Results

Williams Vibra-Lock—for Dams, Bridges, Heavy Construction, Battered Walls, etc. Williams Simplex—for Commercial Buildings, Sewage Disposals, Filtration Plants, Architectural Concrete, etc.

(Freight allowed anywhere in U. S. on order of 100 sets or more at list.)

Send us your plans: We figure the ties, showing locations, etc.

Williams Form Engineering Corp., 46 East Hall St., Grand Rapids, Mich.

(Continued from page 121)

the parties are on fully friendly terms. In this situation the parties make their submission to their mutually agreed board and contract to abide by the award. This should meet the requirements of most controversies, but if either party desires to renege he can, thereby throwing the entire controversy into the court for review. The selection of an arbitrator trained in both construction and the law appears most desirable, where possible.

Conclusion

It is probable that the preparation of bids for all types of construction are tempered with judgment. This is the intangible phase of the bid and is governed in no small amount by the experience of the contractor. In other words, the cold figures of the estimate are adjusted by features peculiar to the entire situation. This will include the availability of other jobs, the probable keenness of competition, the stability of the labor and material market and the availability of an organization to prosecute the job in question. However, it is quite probable that the legal significance of many uncertainties in the future contract should be carefully analyzed in molding into the general bid those features of overhead expense indicated by some of the points raised in this analysis. In most cases a casual knowledge of the basic law is amply sufficient to guide the estimator, and this knowledge can easily be acquired by a small amount of thoughtful reading. In other cases advice of legal counsel is quite important, and should be obtained before, rather than after, the difficulty has arisen.

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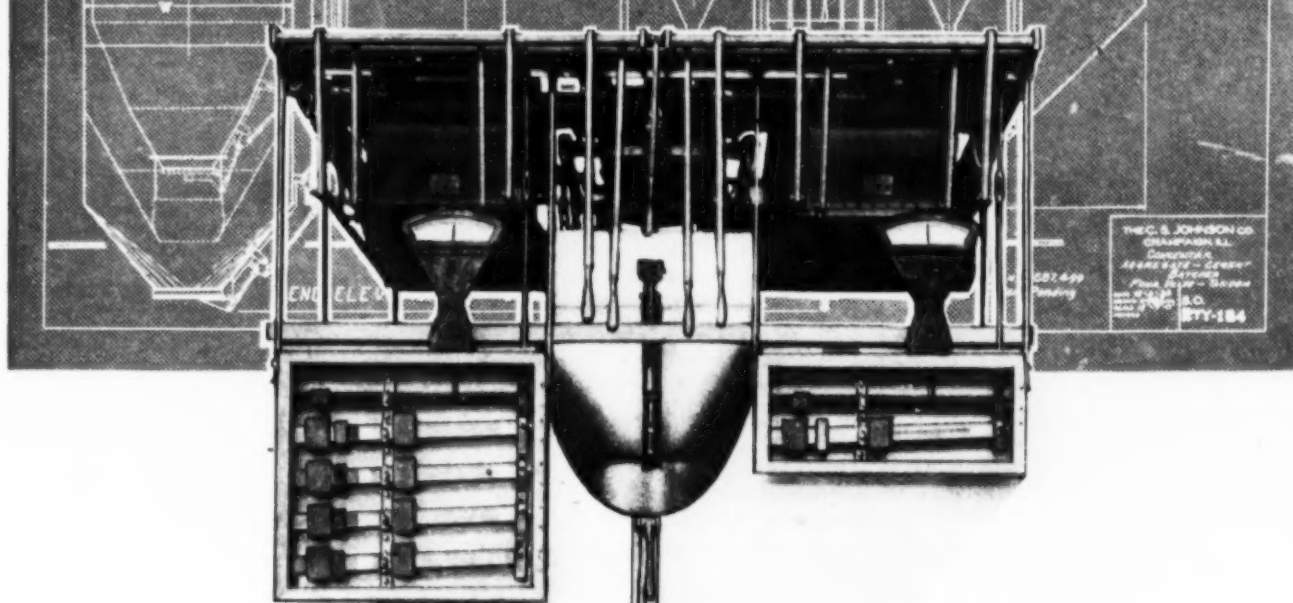
Plastic Replaces Rubber For Certain Uses

NEW FORMULATIONS of ethyl cellulose plastic designed to replace rubber have been found suitable for many uses, the Hercules Powder Co. has announced. Soft formulations of this plastic can be used instead of rubber in gun covers, electrical tape or "friction tape," water tubing to replace brass, raincoats, garden hose and other kinds of rubber hose, wire insulation, golf balls, gloves, impregnated fabrics, coated fabrics, washers, and footwear.

Ethyl cellulose is now produced by the Hercules plant in Hopewell, Va., which is also the largest chemical cotton plant in the world. It is said that the new plastic formulations, although not applicable for tires or inner tubes as presently developed, would probably be suitable for rubber applications which before the war consumed 60,000 tons of rubber.

JOHNSON

CONCENTRIC AGGREGATE CEMENT BATCHER



THE CONCENTRIC AGGREGATE CEMENT BATCHER is an exclusive and patented C. S. JOHNSON CO. product—in reality two separate and independent weigh batchers in one. THE CEMENT HOPPER IS SUSPENDED WITHIN THE AGGREGATE HOPPER on an independent scale, has its own discharge valve, dust shroud and operating parts. The necessity for chutes, screw feed or other mechanical means of conveying cement to the mixer is completely eliminated. CONTROL OF BOTH CEMENT AND AGGREGATE IS BROUGHT TO A CENTRAL POINT.

INTERMINGLING OF AGGREGATE AND CEMENT during discharge assures 20% PRE-MIXING AND PRE-SHRINKAGE and a batch equal to the maximum rated capacity of your mixer. Cement dusting is reduced to minimum. Mixer

gumming is completely eliminated because the cement does not contact the charging openings or mixer drum shell.

JOHNSON CONCENTRIC AGGREGATE CEMENT BATCHERS are constructed with capacities from one to five yards with two, three, or four compartments—manual, semi-automatic or full automatic control. Two standard types represent a basis from which modification and adaptation to any batching bin can readily be made—Model TY 162 where bin bottom and fill valves are arranged in square or rectangular order, and Model TY 164 where bin bottom and fill valves are in line or tandem.

**JOHNSON MAKES BATCHERS TO SUIT
YOUR NEEDS AND SPECIFICATIONS**

**MORE CONCRETE
HAS BEEN POURED
THROUGH JOHNSON**

**CENTRAL MIX PLANTS
THAN ALL OTHER
PLANTS COMBINED**

CENTRAL MIX PLANTS
CEMENT HANDLING
EQUIPMENT
CONCRETE BUCKETS

C.S. JOHNSON CO.
CHAMPAIGN ILLINOIS

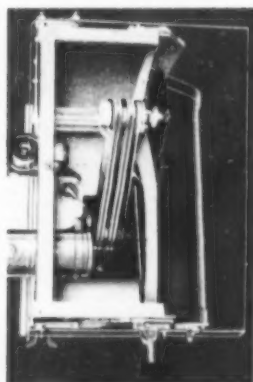
ROADBUILDERS' BINS
AND BATCHERS
SMALL MIXER
BATCHING UNITS



Streamlined KOSTKUTTER POWER SAWS



**FOR SMOOTHER
FASTER SAWING!**



MATCHED V-BELT DRIVE!

Positive power assured by matched multiple V-Belt Drive. Timken bearing swing arbor. Vibration - proofed engine runs on rubber and springs.

Two other popular Saws . . . Kost Kutter Jr. and Power Sawyer.

CONSTRUCTION MACHINERY CO.
WATERLOO, IOWA

Cable Address . . . "Oparo" New York



**MIXERS • PUMPS • HOISTS
BATCHING AND PLACING
EQUIPMENT
SAWS • CARTS • BARROWS**

Practical Hints for Tractor-Scraper Operators

FOR BETTER AND SAFER OPERATION of Le Tourneau tractor-hauled carryall scrapers the following practical suggestions are offered by Bob Burns of Hatch, N. M., who works for the U. S. International Commission at this location.

"First, when you thread cable through sheaves such as power control unit sheaves, take a piece of baling wire and tie on the end of the cable. Thread the wire through the sheaves first, and then pull your cable through with the wire. I'm sure you won't have any trouble and can do it a lot faster and easier. Keep all the kinks and twists out of your cable.

"Second, always use gloves in handling cable, because you are liable to stick a cable burr in your hand. One of our men here a while back stuck a cable burr in his finger and got it infected. He had to lay off for a month. Cable burrs are very dangerous, so be careful when handling cables.

"Third, when adjusting master clutches always kill your motor first. I have seen guys tighten them with the motor running, but they were taking big chances. I know. I used to do it that way myself until one day I got the wrench knocked out of my hand and my finger nearly broken. From then on I kill my motor before adjusting the clutch. It only takes a minute or two to start the motor and is liable to save you a broken hand or finger.

"Fourth, always be careful when winding cable up on the power control unit drums. Don't get in too big of a hurry, and don't be careless. Take your time and wind the cable on straight and even.

"Back in 1939 there was a man working with me who was very careless, always taking chances. One day he was winding cable on the power control unit drum and got his hand caught between the cable and drum. It pulled his whole arm in up to the shoulder, broke his arm in two places and cut one finger off. He was laid off for over a year. So you see, fellows, it doesn't pay to be careless and take chances.

"Fifth, always keep plenty of play in your power control unit levers—both hoist and dump levers—to avoid heating. I always keep about 6 in. play in my levers from where they are in neutral to where they start to engage. Also on the 'dozer.

"Always keep the cables running straight and even on your drums for longer cable life and easier on you."

POWER

...to tip on its toes.
...to hoist and crowd at the same time
...to swing and travel at the same time
...to climb 30% grades
...to pull itself out where the going is tough
...to make money for you



It's power at the business end of a shovel that you need . . . cutting power that brings up a full dipper every time.

In any Byers, "direct drive" delivers maximum power direct to hoist, to crowd, to swing, and to travel in and out where the going's tough. Direct drive eliminates trains of power consuming gears, translates motor power into each working operation or all operations together, with maximum efficiency.

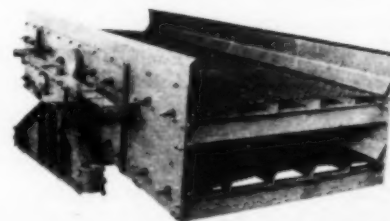
This is another reason why you should investigate Byers $\frac{1}{2}$ to $\frac{3}{4}$ yd. shovels.

Modern CRANES and SHOVELS

BYERS

RAVENNA, OHIO

"X-RAY" CATALOG on GYREX SCREENS



Send for Your FREE Copy Today!

The first few pages of ROBINS new X-Ray Bulletin No. 115 are printed on separate transparent sheets and show the various important parts of the well-known ROBINS-GYREX Vibrating Screen. Together these pages make up a complete screen; but taken separately they permit the reader to study each element of construction and design independently of the rest.

ROBINS CONVEYING BELT COMPANY
PASSAIC, NEW JERSEY

Please send me a copy of X-Ray Bulletin No. 115 ROBINS-GYREX Vibrating Screens.

Name.....

Address.....

NEWS FROM MANUFACTURERS *About Their Products*

The publications reviewed below, will keep you posted on latest developments in construction equipment and materials available for your use.

PORCELAIN PROTECTED WIRING—**Porcelain Products, Inc., Findlay, Ohio.** (32 pp., illustrated.) Pocket-size installation manual and data book gives complete information on porcelain-protected knob and tube wiring specified in list issued by Army and Navy Munitions Board for government projects and made applicable to all other public and private construction by WPB directive. Booklet tells where to use porcelain-protected wiring and gives 1940 National Electrical Code requirements and common construction details for this type of installation.

★ ★ ★

ASPHALT PAVEMENT—**The Asphalt Institute,** 801 Second Ave., New York, N. Y. (10 pp., illustrated.) Information Series No. 49, "Transportation Shortages Affect Asphalt Pavement Design," shows how redesign of pavement structures may be made without sacrificing advantages inherent in normal asphalt construction procedure. Included are "Specifications for Constructing Mechanically Stabilized and Prime Coated Sub-Base for Asphalt Pavements or Surface Treatments," developed jointly by Army's Corps of Engineers, Civil Aeronautics Administration and Public Roads Administration.

★ ★ ★

GLUED WOOD CONSTRUCTION—**J. F. Laucks, Inc.,** Maritime Bldg., Seattle, Wash. (4 pp., illustrated.) "Laucks Glues for War" describes how wood and glue are alternating for steel in prefabricated housing, airplanes, ships, and laminated beams and arches. Booklet also shows simplified methods of glue mixing and application.

★ ★ ★

SPRAY NOZZLES—**Chain Belt Co.,** 1600 W. Bruce St., Milwaukee, Wis. (6-pp., illustrated.) Folder, Bulletin No. 409, describes and illustrates uses of spray nozzles for washing, cleaning, cooling and descaling. Nozzle is described as non-clogging device which throws flat fan-like, hard hitting spray with such force that it removes dirt and grit from most irregular surfaces. Originally developed for cleaning traveling water screens, spray nozzle has since been adapted for many other purposes, such as washing stone and gravel.

★ ★ ★

CLEANING OF INDUSTRIAL FLOORS—**The Magnus Chemical Company, Inc.,** Garwood, N. J., (24-p. bulletin.) Written not only from the viewpoint of cleaning floors for personnel safety by the elimination of greasy, slippery floors, but from that of cleaning floors for longer floor life, it provides the one in charge of floor maintenance with a guide to the selection of the proper type of cleaning material best suited to his floors. The bulletin covers the cleaning of practically every type of flooring material used in all types of buildings, from industrial plants to hotels, public buildings and institutions. Among the types of floors discussed are: concrete, wood, painted, or varnished, linoleum, cork tile, rubber and terrazzo. Some of the other subjects are headed: "Why Clean Floors?" "The General Problem of Floor Cleaning," "What Does a Floor Cleaner Have to Do?" "Suspension of Dirt" and "Rinsing."



"ON THE ROAD TO MANDALAY"?

- These Marmon-Herrington *All-Wheel-Drive* converted Fords, shown in the Australian Military Vehicle Parade in Melbourne, may be anywhere in the South Pacific, or Asia, now. But wherever they are, they are providing dependable transportation for United Nations troops.
- On sandy beaches, churned by thousands of feet and wheels, they will plough through—where "ordinary" trucks would spin their wheels in impotent effort. Through jungle mud, across streams and up mountain grades that would stop conventional vehicles in their tracks, *traction on all wheels* insures fast and steady progress.
- Hundreds of Marmon-Herrington *All-Wheel-Drives* were shipped to Australia and New Zealand long before this war broke out in the Pacific. Hundreds more have followed since the Japs committed national Hara-Kiri by attacking the United States.
- You, who are users of Marmon-Herrington vehicles in the oil fields, in road construction and maintenance, in public utility services, etc., should be glad that *your purchases of these trucks built the organization and facilities that have made this contribution to America's war effort possible.*
- In MacArthur's drive up through the islands to the mainland of Asia—*which is surely coming*—Marmon-Herrington *All-Wheel-Drives* will be in the vanguard—performing the same "impossible" feats they have done for years in the world's most difficult civilian jobs of transportation.
- Invest the money you would pay for additional Marmon-Herringtons in United States War Bonds—and *help speed the Victory day!*

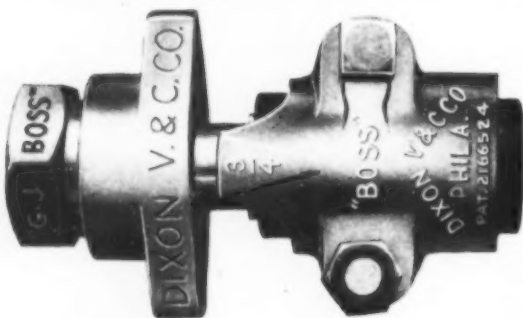
MARMON-HERRINGTON CO., Inc., Indianapolis, Indiana
Cable Address: MARTON



"GJ-BOSS"

GROUND JOINT

AIR HAMMER COUPLINGS



Tunnel jobs or surface jobs... the work moves on schedule when you rely on these safe, tight-holding air hose couplings to keep the drills, spades or hammers going. Ground joint, washerless construction provides a leakproof, trouble-free seal between stem and spud; and the husky "BOSS" Interlocking Clamp eliminates all danger of blow-offs. They are "easy on the hose"... an important factor in conserving rubber.

Compact Type, Style XLB-61, $\frac{1}{2}$ " and $\frac{3}{4}$ ". Heavy Type, Style XHB-72, $\frac{3}{4}$ " and 1".

NOTE—For washer type couplings of otherwise identical design, specify "BOSS" AIR HAMMER COUPLINGS—Compact Type, Style WLB-21, $\frac{1}{2}$ " and $\frac{3}{4}$ ". Heavy Type, Style WHB-32, $\frac{3}{4}$ " and 1".

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VALVE & COUPLING CO.

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BRANCHES: CHICAGO • BIRMINGHAM • LOS ANGELES • HOUSTON

WELDING HANDBOOK—The Lincoln Electric Co., 12818 Coit Rd., Cleveland, Ohio. (1,308 pp., illustrated) Procedure Handbook of Arc Welding Design and Practice, seventh edition, containing 1,810 illustrations (photographs and drawings) is divided into eight parts: I—Welding Methods and Equipment (26 pp.), II—Technique of Welding (116 pp.), III—Procedures, Speeds and Costs (119 pp.), IV—Weld Metal and Methods of Testing (30 pp.), V—Weldability of Metals (98 pp.), VI—Weld Steel Construction—Machine Design (204 pp.), VII—Designing of Arc Welded Structures (274 pp.), VIII—Typical Applications of Arc Welding in Manufacturing, Construction and Maintenance (439 pp.). Price postpaid U.S. \$1.50, elsewhere \$2.00.

★ ★ ★

EXTRUDED PLASTICS—R. D. Werner Co., Inc., 380 Second Avenue, New York, N. Y. (15 pp., illustrated.) Use of plastics as substitutes for critical materials is briefly covered in book suggesting possible applications and giving data on maximum, minimum and stock shapes for rods, tubes, flat and decorative strips, angles, molding and trims. Table presenting general physical properties of various plastics is included.

★ ★ ★

CONCRETE FLOORS—Washington Concrete Co., Empire State Bldg., New York, N. Y. (10 pp.) Pocket leaflet, "The Secret of Laying a Heavy-Duty Industrial Floor," discusses present-day demands, necessary characteristics of a heavy-duty floor and how these characteristics are obtained.

★ ★ ★

PUMP DATA SHEETS—Goulds Pumps Inc., Seneca Falls, N. Y. (Folio of data sheets, illustrated.) As a special war-time service to pump operators, pump application sheets, originally prepared for confidential use, are now available to engineers and contractors. Sheets, of from 2 to 8 pp. each, include both elementary and advanced technical data on selection, installation, operation and maintenance of all types of industrial pumps for general and specialized services. With 18-p. booklet, "Pump Fundamentals," sheets are furnished without charge, in durable file folder containing extra pocket for recipient's own notes and hydraulic data. From 6 to 14 sheets are placed in each folder, depending upon type of information most useful to recipient. Elementary sheets will be of assistance in training inexperienced employees, while more technical sheets should help operators get maximum performance from existing equipment, regardless of its manufacture. Address requests to Department 19, Goulds Pumps, Inc., Seneca Falls, N. Y.

★ ★ ★

BLACKOUT, AIR-RAID DAMAGE AND GLASS SPLINTER PROTECTION—Clinton Carpet Co., Merchandise Mart, Chicago, Ill. (12 pp., illustrated) Brochure claimed to offer comprehensive and authoritative analysis of this vital wartime problem and to offer practical means for its solution through use of Ozite air raid safety blanket and Ozite blackout blanket.

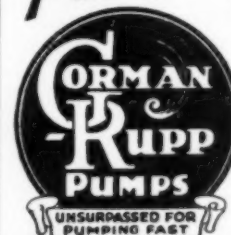
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PROJECTED WOOD SASH—National Door Manufacturers Assoc., Inc., 332 S. Michigan Ave., Chicago, Ill. (8 pp., illustrated). Describes new sash, engineered by architectural firm of Graham Anderson, Probst & White under special technical supervision representing above manufacturers and offered in eighteen standard basic units, each one opening by itself. May be installed individually or may be combined, in height and width, to meet almost any installation requirement in industrial and commercial buildings. Frames completely factory fitted and all sash pre-fitted to exact size to minimize installation labor in field. Manual contains complete information with specifications and detail drawings for both in- and out-projecting types and various combinations of units.

The Equipment Distributor can conserve your machinery

Valuable equipment, built for years of service, falls short of requirements whenever neglected. New equipment is highly restricted because it takes materials needed so badly for other war purposes. Present equipment can quickly be restored to dependable operating condition by replacement of worn parts. Gorman-Rupp Distributors stock parts for equipment they sell and repair all makes of machines, Mixers, Pumps, Shovels, etc., at reasonable prices. You will help win the war when you conserve valuable equipment by having a Gorman-Rupp Distributor repair it NOW.

Keep'em Pumpin'



THE GORMAN-RUPP CO.
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G & R Pumps are not "frozen". All Gorman-Rupp Distributors have them for immediate delivery.

SPEED—SAFETY ECONOMY AND FLEXIBILITY



The Ultimate
In Lifting and
Pulling Equipment

COFFING'S
"SAFETY-PULL"
RATCHET LEVER HOIST

The Most Useful
Tool in Any Main-
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Conserve Your Hoisting
Equipment—It is a Price-
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of PRODUCTION

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COFFING HOIST CO.

Ratchet Lever, Spur Geared and Electric Hoists

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DANVILLE, ILLINOIS

**BUT
FOR SAFETY ON
WIRE ROPE.**



The Laughlin Safety Clip takes the rope in its all-round grip of drop-forged steel. Four flat bearing surfaces grip the rope without weakening or distorting it, delivering 95% of the rope's strength. No finger-pinching U-Bolt bite — bowing and weakening rope below the clip, inviting breakage and accident, or slippage if the U-Bolt goes on backward. Inexperienced help make this last a real hazard.



**Save Steel—Save Time—Save Accidents
for Full War Effort**

There's 25% less steel in a Safety Clip assembly that's as strong as a U-Bolt job. That means more valuable steel for armaments when you buy Safety Clips. Help keep 'em rolling — use the safer, foolproof Safety Clip. And no crimped rope ends to be cut off as wasted metal — rope costs money these days.

And YOU Make These Savings!

No rope bowing or crimping.....rope saved
No battered, bent threads.....clips saved
No special wrench.....tools saved
Bolts on opposite sides.....tightening time saved
Can't go on wrong.....accidents saved
Fewer clips needed.....clips saved
Fewer rope breaks.....accidents saved

*Distributed Exclusively Through
Mill Supply Houses*

**Look for Laughlin Products in
Pit & Quarry Handbook**



WROUGHT IRON FOR SEWAGE TREATMENT AND DISPOSAL INSTALLATIONS — A. M. Byers Company, Pittsburgh. (28 pp., technical bulletin illustrated.) The booklet, for use of designers and engineers of sewage disposal plants, discusses various corrosive conditions encountered in designing sewage disposal water lines outfall line service, drainage lines, and heating system returns. Describes properties of wrought iron and how wrought iron lends itself to corrosion control. Pictures are shown of a number of actual sewage disposal plants in various cities, with the main features of each explained. Also shown are various heating coils in sludge digester tanks. Corrosive problems in these are discussed as well as those encountered in manhole ladder steps, air lines and distributor arms.

★ ★ ★

LOCK NUTS — An-cor-lox Division, Laminated Shim Co., Inc., 86 Union St., Glenbrook, Conn. (6 pp. illustrated.) Folder on An-cor-lox Lock Nuts is full of diagrammatic, photographic and factual matter on styles, materials, designs and finishes; application instructions; and suggestions for parts conversion for use of these devices. Nut is self-contained, with all-metal construction, and is devised both for extreme locking security, and speed and ease in applying. Besides being re-usable makers claim that its locking power actually increases with repeated re-use. Offered in a full range of sizes and metallic alloys to meet virtually all service conditions of atmosphere, temperature, endurance, vibration and shock.

★ ★ ★

CONCRETE ARCHES — Portland Cement Association, 33 West Grand Ave., Chicago, Ill. (20 pp. illustrated.) Modern Developments in Reinforced Concrete, No. 3, presents analysis of arches, rigid frames and sewer sections in clear, understandable form for benefit of designers.

★ ★ ★

VIBRATING SCREENS — Robins Conveying Belt Co., Passaic, N. J., (12 pp. illustrated.) Describes and illustrates line of Vibrex screens available to users in two styles, M and J. Former is larger, heavier screen for floor or suspended mounting with single or multiple decks; latter is smaller and lighter screen for suspended mounting and, in standard construction, for single deck only. Lists features and advantages of each style, gives tables to dimensions and devotes two pages to description of contractor's screen, special adaption of style "J" Vibrex, double deck unit made in one size only (16x36 in.). Said to be especially adapted for use at roadside contractors' plants and all work of similar character.


★ ★ ★

PIPE TOOLS — Beaver Pipe Tools, Inc., Warren, Ohio. (42 pp., illustrated.) Covers complete line of portable pipe and bolt cutting and threading machines, power drives, power units. Pipe cutting and threading tools in sizes from 1/8 to 12 in. Also pipe reamers, vises, sawing vises, grooving and beveling tools.

★ ★ ★

MODERN EXCAVATOR — Trackson Co., Milwaukee, Wis. (8 pp., illustrated.) "Let's Dig In and Win" is title of pictorial bulletin featuring use of Traxcavators, heavy-duty tractor excavating and loading machines, digging and moving earth for construction of airports, defense plants, oil pipe lines, defense housing and highways; for maintenance work on railroads, digging in clay pits and kindred operations. Included are mechanical views and specifications of three models, T2, T4 and T7, and action pictures showing Traxcavator mounted on track-type tractors digging in tough soils, loading excavated material directly into trucks and wagons, carrying loads to hauling units, and piling, casting, spreading and backfilling—one machine for a variety of jobs.



Laughlin offers you the most complete line of hoist hooks on the market, in the most varied and fool-proof choice of safety designs — all drop-forged from selected steel and heat treated. Look for the , the sign of strength and safety.



The Safety Hook That's Really Safe

A safety latch (as illustrated) is available on all sizes and styles of Laughlin Hoist Hooks. The properly designed, stout-sprung safety feature securely traps the sling — no hazard of accidental slipping or jolting off.



**THE STRONGEST OF ALL DESIGNS —
LAUGHLIN'S CARGO HOOK**

Well known to shipping men, this hook is designed for a straight pull. It is as strong as a standard hook twice its weight. The protective tooth prevents hook catching and tipping the load. Hooked lip gives added security.

Available for 2, 4 and 10 ton loads.

Laughlin's Latest Catalog Shows the Complete Line of Laughlin Wire Rope Fittings. Send for it.

*Distributed exclusively through
Mill Supply Houses*

**Look for Laughlin Products in
Composite Catalog**



A pound of REPAIR * * *

is worth a ton of REPLACEMENT

Equipment kept in repair has double WAR Value

- 1 It stays longer on the job, keeps out of the repair shop.
- 2 Constant repairs postpone equipment replacements and conserve valuable war materials.

That's the whole story in a few words. Surely no hard-headed and patriotic equipment user needs to be SOLD on the urgent need for "doing the most with what we have." If you're using Reliance Products and repairs DO become necessary, you'll find their rugged simplicity a big asset in such work. There's nothing complicated or hard-to-fix about Reliance Equipment. The same construction that makes them stand up on the job makes them easier to fix. Don't wait for breakdowns. Go over your equipment NOW and you'll be well repaid for your time and trouble.

UNIVERSAL ROAD MACHINERY CO.
KINGSTON, N. Y., U. S. A.

Distributors in ALL principal cities of the U. S. A.

•Want advice? write RELIANCE

If you're using Reliance products, tell us which ones and we'll be glad to advise you how to stop trouble before it starts. This service creates no obligation on your part. Write us today.

RELIANCE PRODUCTS

Reliance offers a complete line of Rock Crushers; Bucket Elevators; Revolving Screens; Storage Bins; Pulverizers; Chip Spreaders; Heating Kettles; Bin Gates; Feeders; Belt Conveyors; Grizzlies; Air Separators; Sand and Gravel Spreaders; Wash Boxes.



MILLIONS of Sterlings

It is an impressive fact that literally millions of wheelbarrows have been manufactured by the Sterling Wheelbarrow Company since its inception almost 40 years ago. Regiments of sturdy Sterlings are now helping Uncle Sam win the War . . . and more will be available in the reconstruction period ahead.

STERLING WHEELBARROW CO., MILWAUKEE, WIS.

Sterling WHEELBARROWS

Look for this Mark of **STERLING** Quality



Small Tools Speed

Cantonment Construction

(Continued from page 58)

brick construction, glazing and greasing.

A large amount of sheet metal duct for heating and ventilating necessitates the use of a notcher that saves 75 percent of the labor cost.

Concrete vibrators for thin wall sections are self-contained, gasoline-engine-driven, portable units. In cantonment work the buildings are spread out over a wide area, and to get either air or electric power lines to the structures from a central point would mean a large investment in strategic and unavailable steel or copper. The engine of the portable unit can be placed inside a concrete buggy and moved from one building to another. It runs only when one vibrator is in use, thus saving fuel that would otherwise be burned by a central unit serving several vibrators.

Emphasis on all Army work is on speed and more speed and this must be accomplished in the face of a scarcity in skilled labor. Tool manufacturers have come to the rescue with automatic portable tools that permit a slightly trained carpenter to turn out a greater volume of work more accurately than master craftsmen with many years of experience could do before. The modern carpenter sets up an automatic, adjustable mortising tool on a door that is already hung and cuts a lock recess in exactly the right place in a few minutes. Electric drills and saws, both stationary and portable, joiners, sanders and a host of other tools are making it possible for American contractors building cantonments to complete their work on time.

* * *

Used Equipment Rebuilt and Yard-Tested

(Continued from page 53)

include the shop crane, a spur track at rear of yard and a truck unloading pit. The yard is spacious for storage of equipment. At the rear of shop building and under a separate roof is the sand-blast room. The steam-cleaning unit and wash rack are in the open. Across the

(Continued on page 130)

Don't Let Corrosion Sabotage Your Wire Rope

The illustration at the right was made from an unretouched photograph of a wire rope used for hoisting in a coal mine. It fell an early victim to corrosion because it was not kept properly lubricated.

**Proper Lubrication
Helps Wire Rope
Resist Corrosion**

CORROSION is an enemy saboteur that is constantly trying to destroy your wire rope. Unless combatted by proper lubrication, normal rope life is greatly shortened and a serious hazard to safety created.

Wire Rope is an intricate machine with many "bearings". If it is to give the full service of which it is actually capable, these points of contact—both externally and internally—must be kept correctly and adequately lubricated at all times.

The right kind of lubricant to use and the frequency with which it should be applied depends upon the conditions under which your rope is operating. When in doubt, we suggest you consult with an experienced wire rope manufacturer.

Now that steel is so urgently needed for so many implements of war, the more "work hours" you can get out of your wire ropes, the more steel you save for other vital purposes. So in all earnestness we repeat — *Don't let Corrosion sabotage your wire rope.*

* Important *

An idle wire rope is more vulnerable to corrosion than one in use, so be sure to give your ropes the protection of a good lubricant when they are not in service.

A. LESCHEN & SONS ROPE CO.

WIRE ROPE MAKERS

5909 KENNERLY AVENUE

ESTABLISHED 1857

ST. LOUIS, MISSOURI, U. S. A.

NEW YORK 90 West Street
CHICAGO 810 W. Washington Blvd.
DENVER 1554 Wazee Street



SAN FRANCISCO 520 Fourth Street
PORTLAND 914 N. W. 14th Avenue
SEATTLE 3410 First Avenue South



**THE PILES GO
DOWN
THE PLANTS GO UP**
*Ships-Planes and Tanks
Keep Pouring Out*
behind the night and day
drive-drive-drive of

UNION HAMMERS

This is no time for anything less than UNION Pile Hammer strength and speed and simplicity! These are the days when builders realize the tremendous advantage of the UNION double-acting drive . . . UNION simple, one-piece frame, absence of moving parts . . . UNION central-point lubrication. You can drive with a UNION on either steam or compressed air (and - little of it) without change of parts - get down the largest piles or longest steel sheeting FAST! A complete series to select from, for all types of driving, all UNION, all dependable.

★ ★ — and this other

UNION EQUIPMENT

AIR LOCKS	CABLEWAY SKIPS
BUCKETS	CONCRETE PLACERS
GROUT MIXERS	FOUNDATION
AND EJECTORS	EXCAVATOR SKIPS
PILE DRIVER	SPECIAL
HOISTS & LEADS	MACHINERY

Ready! —for quick reference and ALL FACTS on what UNION makes for speedy plant construction — write or wire NOW for Catalog 184.

UNION IRON WORKS, INC.

Engineers and Manufacturers
Spofford & Lidgerwood Aves. Elizabeth, N. J.

(Continued from page 128)

20-ft. driveway from the shop building is another brick and steel building which is used as a warehouse for storage of repaired equipment.

Shop Facilities

The shop facilities include three electric welding machines, gas welding units and cutting machines, preheating oven, forge and blacksmithing equipment, lathes, drill presses, key milling machine, valve grinding and resurfacing unit, a set of rolls, a brake, shear, hydraulic press, grinders and compressors. With this equipment we have been able to dismantle completely and rebuild machines from 3/4-hr. gas engines up to 3-yd. capacity power shovels and a 4,000-lb. batch asphalt plant. At the present time we are rebuilding black-top pavers, truck mixers, pumps and oil distributors, for the U. S. Engineer Department. We are also running compressors, concrete mixers and conveyors, through the shop for customers.

During the last 20 months we have overhauled approximately 18 power shovels, many tractors and other pieces of heavy equipment. We have long had an established policy of rebuilding completely any machine that is to be resold, so that it leaves our shop with a new machine guarantee. This rebuild consists of complete dismantling, sand-blasting, cleaning and then re-assembling the unit and finally testing and painting.

★ ★ ★

Contractor's Central Shop

*Maintains and
Repairs*

Earth-Moving Equipment

(Continued from page 55)

the hub and spokes. New rims of manganese steel are kept on hand.

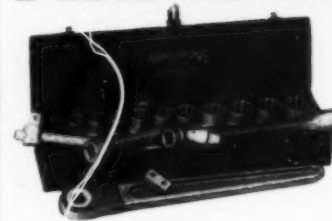
The procedure is to lay the old sprocket or idler wheel down on a table, bolt it through the center, and fasten it with lugs at three points along its periphery. Then the old spokes are burned through at a point to match the replacement rim, the old rim is removed and the new one placed in position. The spokes are welded into place, after which the wheel is placed on an arbor and the welding job completed. In

(Continued on page 132)

ARMSTRONG

WRENCHES

- open end
- Box Socket
- Detachable Socket
- Construction Ratchets



There are ARMSTRONG Wrenches for your every need and each is the finest tool of its type.

ARMSTRONG Socket Wrenches extensions and handles are Chrome-Vanadium Steel. Ratchets are drop forged steel and the patented ARMSTRONG Driveloek locks sockets, driver ratchets and handles to each other — will not knock or pry apart, sockets can not fall off.

ARMSTRONG Giant Construction Ratchets are drop forged steel. Nut sockets are machined from solid bar stock.

ARMSTRONG Drop Forged



Structural and Construction Wrenches come in several types, in high carbon or Chrome-Vanadium steel. Large stub end box socket wrench takes long slip over handles.

Write for Catalog

ARMSTRONG BROS. TOOL CO.
"The Tool Holder People"
334 N. Francisco Ave.
Chicago, U.S.A.
Eastern Warehouse & Sales:
199 Lafayette St., New York

What Makes a Mailing Click?

Advertising men agree . . . the list is more than half the story. McGraw-Hill Mailing Lists, used by leading manufacturers and industrial service organizations, direct your advertising and sales promotional efforts to key purchasing power.

In view of present day difficulties in maintaining your own mailing lists, this efficient personalized service is particularly important in securing the comprehensive market coverage you need and want. Investigate today.



McGraw-Hill Publishing Co., Inc.

DIRECT MAIL DIVISION

330 West 42nd St., New York, N. Y.

May the wreath we have won never wither

THE War Department and the Navy Department of the United States have conferred upon the men and women of Chain Belt Company the highest honor that can be paid to civilians engaged in war work... the Army-Navy "E" for outstanding achievement in production.

Because of our knowledge of the intense determination for Victory which has inspired Chain Belt workers in their willingness to serve and sacrifice, we were not surprised that the award was made. We knew it had been earned

and we are gratified that this just recognition has been given.

The Army-Navy "E" pennant will fly proudly from the Chain Belt flagstaffs; and from the lapel of every worker will gleam the shining badge of honor which the Government has cast to signify individual and collective effort beyond the normal conception of duty.

Chain Belt will endeavor to maintain the pace which it has established—to produce more and more for the triumph of our arms.

May the wreath we have won never wither!



THE LAUREL of this wreath is a symbol of the Victory which Chain Belt workers are determined to win.

THE OAK of the wreath symbolizes the strength of the nation—on the battle lines and on the production front.

CHAIN BELT CO.
OF MILWAUKEE



When BIG MACHINES go into ACTION
on the
INDUSTRIAL FRONT

They are generally MOVED
on **ROGERS TRAILERS**

EXPERIENCE BUILDS 'EM
PERFORMANCE SELLS 'EM

ROGERS BROTHERS CORP.
220 Orchard St., Albion, Pa.



Let "One Man" Simplex Jacks
do the work of a gang



One man and Push
and Pull Jacks
clamps beams,
angles, plates for
structural welding.

One man and
Simplex Pipe Puller
recovers service
pipe for salvage or
replacement. Sim-
plex unit for both
pushing and pull-
ing pipe.

One man and
Cable Tensioning
leg pulls stiff
guy wires and
underground cable,
tensions bare or
covered electric
cable.

One man and Sim-
plex Pole Jack lifts,
moves or straight-
ens loaded poles,
butts, piling.

Templeton, Kenly
& Company
CHICAGO, ILL.

Better, Safer Construction Jacks
Since 1899



Send for Catalog 41

(Continued from page 130)

building up idler wheels and track run-
ners, too, a good job of welding is all
that's necessary; grinding has been
eliminated.

Thorough Inspection Necessary

While the machine is down, every
point is checked. Shepard has found
that the biggest cause of premature
failure of a machine following an over-
haul is failure to inspect it thoroughly.
The engine is gone over completely. If
necessary, new cylinder liners are in-
stalled. Nowadays, they usually have
the top ring groove and the land mach-
ined to accommodate a wider piston
ring. They used to replace the piston;
now, they're too hard to get. Every
bearing is checked. Roller bearings fre-
quently need setting up; failure to do
this means a breakdown a short time
later and an expensive replacement.

Typical Repair Jobs

On a typical day the shop men will
be tearing down two or three rollers.
Here, too, parts that used to be thrown
away are rebuilt and will see many
more hours of service. A typical repair
job is on the differential pinion gear of
a roller which has suffered the loss of a
few teeth. A template is made to match
the pitch of the mating gear, and the
missing teeth are built up. Similarly,
all the teeth on the bull pinion gear
may be built up again to their original
pitch, then finished with a hand grind-
er, saving long weeks of delay in secur-
ing a new gear.

Worn shafts are likewise built up,
then sent out for turning down in a job
shop. So far, the company has found it
preferable to farm out machine work.

Preformed Wire Rope Used

Scrapers, although ruggedly fabri-
cated of heavy plate, need thorough over-
hauling from time to time. The bowl
may become misaligned, the cutting
edge may become worn, and other parts
may need repairs. So the scraper is
torn down completely, and it's not un-
usual to fabricate an entire new bowl
of plow steel. All points are checked
and necessary welding is done, sheaves
are removed and re-bushed, if neces-
sary, and the wire rope is checked. Or-
dinally the sheave grooves are in
fairly good condition, for the company
has standardized on preformed wire
rope as a preventive maintenance meas-
ure. With the older type of cable, they
have found that broken ends tend to
"porcupine" away from the body of the
rope, chewing up the grooves, which in
turn wears the cable still faster. Pre-
formed wire rope, on the other hand,
has been found to resist bending fatigue
longer. And when the wires finally do
break, they lie flat to the body of the
rope, and the cable runs over the
sheaves smoothly.

Field maintenance, too, is claimed to
have been cut by the use of preformed
wire rope. Scrapers are notoriously

(Continued on page 134)

SPEEDING JOBS with COMPRESSED AIR

Saving Fuel and Time with



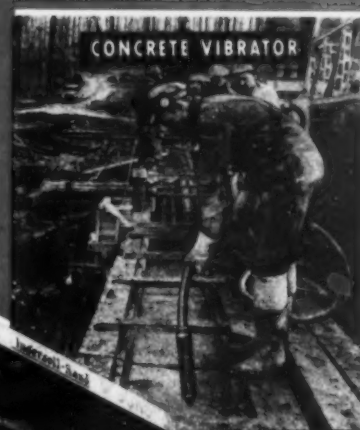
A few pounds of metal...a Jackhammer, for instance, operated by compressed air...transforms a man of the street into a tower of strength. By multiplying his efforts a hundredfold and thus increasing his productivity, he becomes a better soldier on the home front...just as formidable to a mountain of rock as a Flying Fortress bombardier is to his target.

Compressed-air-operated tools are light in weight, easily handled, quickly adapted to many kinds of work, and economical to operate and maintain. Many jobs cannot be done as well, or even at all, with any other form of power. These are a few of the reasons why Ingersoll-Rand compressors and air tools are so necessary in building our vital roads, air fields, runways, pipe lines, bridges, tunnels, factories, planes, tanks and ships.

This page illustrates outdoor applications of typical Ingersoll-Rand air tools and Ingersoll-Rand's MOBIL-AIR. And here's what users are reporting about this portable compressor:

Fuel Savings of 35% or more—based on comparisons with conventional-type portables. One reason is the patented Drill-More Regulator, which adjusts the engine speed to the amount of compressed air consumed. Wasteful idling periods are eliminated.

Speedier Work by Air Tools—and a consequent speed-up of jobs—is effected by the action of the Drill-More Regulator. MOBIL-AIR Compressors maintain more uniform and higher average air pressures...air tools operate as much as 15% faster than the same tools used with conventional portables.



CONCRETE VIBRATOR



315-CFM
MOBIL-AIR



IMPACT
WRENCH



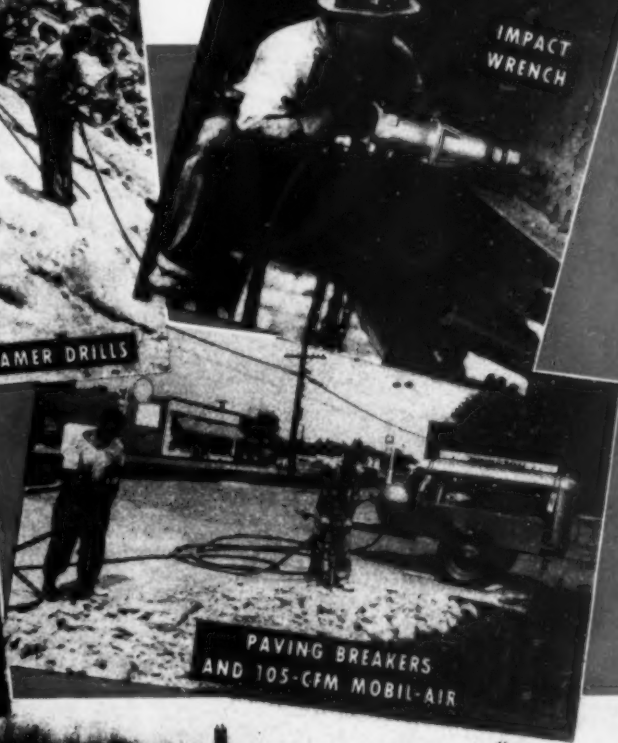
WAGON DRILLS



SUMP PUMP



PILE DRIVER



PAVING BREAKERS
AND 105-CFM MOBIL-AIR



500-CFM MOBIL-AIR COMPRESSORS EACH OPERATING TWO WAGON DRILLS

Ingersoll-Rand



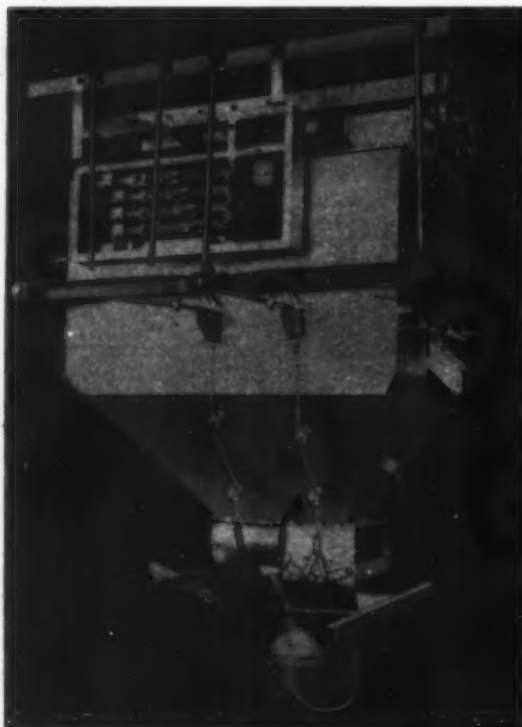
MODERN wartime parachutists control speed of descent and directional drift by shroud-line manipulation. Owen bucket closing speed is inversely proportionate to closing power and adjustable reeving makes possible maximum closing speed or maximum closing power whenever either are required by digging or rehandling conditions.

THE OWEN BUCKET CO.
6020 Breakwater Avenue, Cleveland, Ohio
Branches: NEW YORK, PHILADELPHIA
CHICAGO, BERKELEY, CAL.



TEN REASONS WHY THE BUTLER AGRACEMENT BATCHER WILL DO IT BETTER

- Entire scale system is simpler, more rugged, and trouble-free. There are no cast iron parts to break.
- Raised graduations on scale beams permit easy reading.
- Self-locking poises seat themselves accurately, require no thumbscrews.
- No clumsy shot cups to balance beams; poise type weights are used.
- Tell-tale dial mounted on scale beam indicates balance plainly, will not bind like stationary type.
- Compact beam box is handier, keeps cleaner.
- Two compartment hopper is all-welded of heavy plate, has steep, obstructionless slopes.
- Exclusive Twist-of-the-Wrist discharge is faster and simpler to operate than any other type; permits close grouping of all operating levers.
- Clamshell gates have no racks or gears, cannot jam.
- Entire batcher is compact, rugged, and efficient, occupying less room and providing greater convenience of operation.



BUTLER BIN COMPANY • Waukesha, Wis.

(Continued from page 132)

hard on cable; many are rigged with reverse bends and small sheaves, with the result that bending stresses are at a maximum. Preformed rope, in which the wires forming it are relieved of internal stresses, is said to resist this type of fatigue much longer. This factor saves valuable time on the job which otherwise would be lost in re-outfitting the cable.

Power shovels are given as thorough a treatment as any lesser piece of equipment. They are completely dismantled, and boom and dipper stick, engine and clutches, brakes and cable drums, crawler mechanism and turntable, are all checked and repaired or rebuilt, as necessary. Trucks are sometimes overhauled by the Ball organization, but more often are sent out to the distributors' shop.

Spare Parts

Contributing to the efficiency of the shop is a system of parts identification. Hundreds of bins, each lettered and numbered, have been built in the parts storage shed. A master file containing a memo of every part in stock makes it possible to obtain the required part immediately. This record is also valuable in planning the inventory ahead; for the parts' man is able to detect impending shortages months ahead of time, and place his order in time to allow for the slow deliveries of today.

Much of the Ball organization's work is on a high priority basis and often they can get a part without loss of time. But they have realized one of the biggest truths in the war program: To win, we must conserve.

★ ★ ★

On-the-Job Maintenance

**Keeps Trucks
in Service
For Duration**

(Continued from page 64)

perature, otherwise the brakes might drag.

Major Adjustment

Before adjusting the brake shoes to their final operating clearance, remove all traces of rough or high spots on the lining (Fig. 11). A brake shoe adjustment gage (Figs. 9 and 12) should be

used to check the concentricity of the brake lining with the drum.

The following procedure for making major brake shoe adjustments must be applied after relining brake shoes (Fig. 13), after removing shoes for any pur-

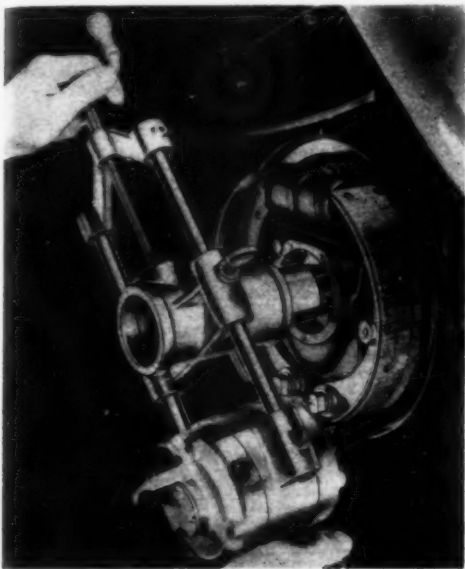


Fig. 11 . . . **NEW BRAKE LINING** is ground with special tool to remove high or rough spots and make lining as concentric as possible with brake drum.

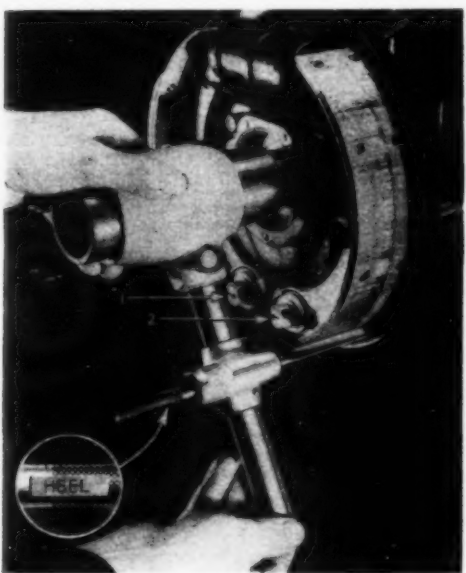


Fig. 12 . . . **FOR MAJOR BRAKE ADJUSTMENT.** anchor bolts at heels of brake shoes are loosened until arrows (1 and 2) or other indicating marks (Fig. 14) point toward each other. Anchor bolts then are turned in directions shown by rotation arrows to decrease clearance between brake lining and brake drum at heels of brake shoes. To check this clearance, finger of brake shoe gage (arrow is set with "heel" in position shown, and brake shoe heels are adjusted until finger just contacts lining.

pose and after replacing or resurfacing the brake drums:

(1) REMOVE THE WHEEL AND HUB.

(2) REMOVE BRAKE SHOE RETURN SPRINGS and test the spring tension by comparing with a new spring.

(3) INSPECT LINING FOR EXPOSED RIVET HEADS, abnormal wear

(Continued on page 138)



"We All Depend on Continental Red Seal Engines"

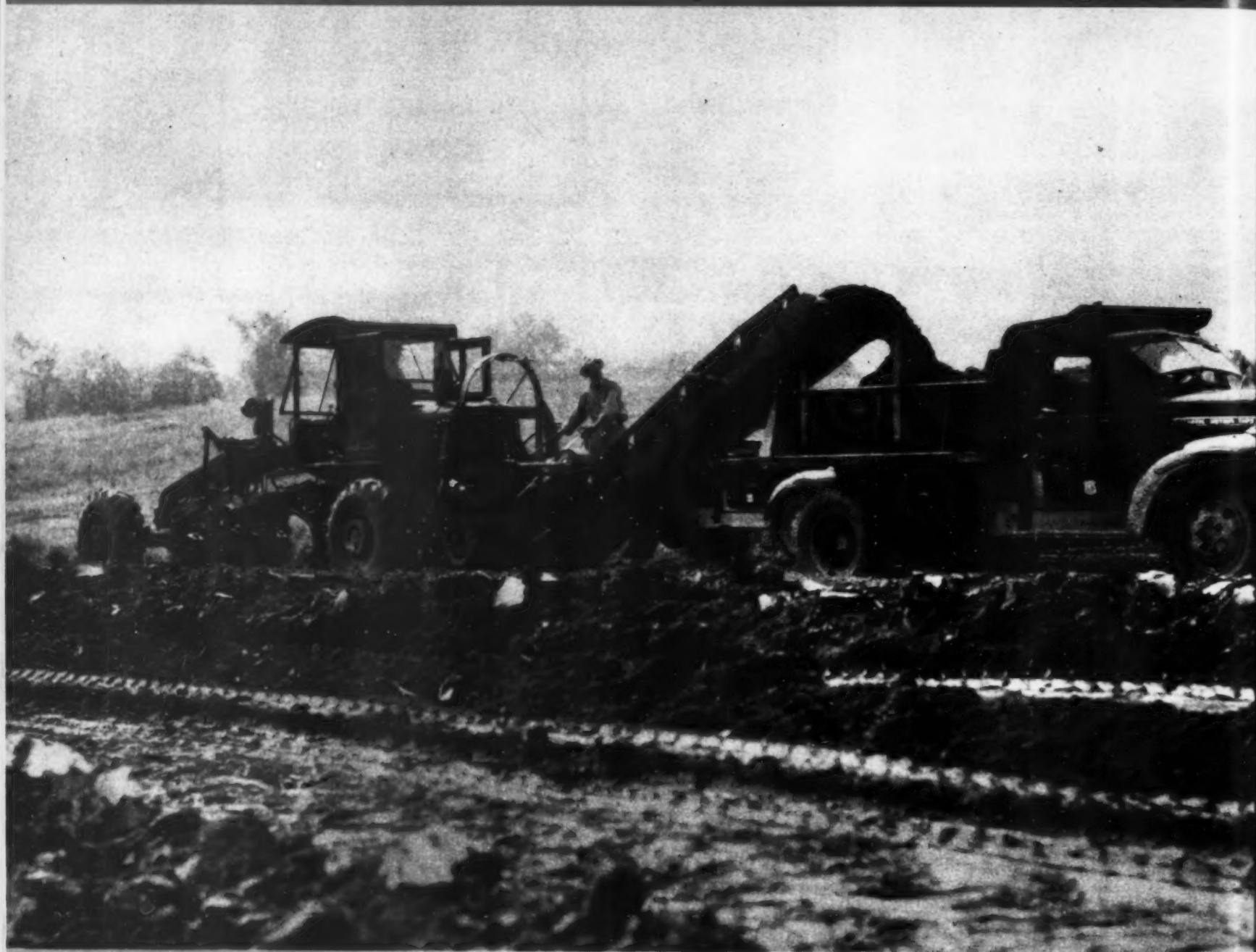
Whether it's in a plane, a tank, a truck,
a tractor, or for industrial use — these
operators know that when it comes to
real performance, they can always
depend on Continental Red Seal Engines.

Continental Motors Corporation

MUSKEGON, MICHIGAN



**WHEREVER WAR NEEDS PUT A
PREMIUM ON RESULTS
THERE'S A NEW APPRECIATION
OF "99M" PERFORMANCE**



Says H. R. ANDERSON of Robert R. Anderson Co., Chicago:

"While working on a government job we used a '99' to establish the grade for the forms. Its 4-wheel drive eliminated the danger of wheel-spinning and gouging, and as a result the work this machine has done has been accurate and very satisfactory. It's really the busiest machine on the job. The same '99' that handled the form grading was used to build the truck roads to the job and to maintain them."



99M's are playing an important part in the construction of America's vital airfields. From the first rough grading to the final spreading of the asphalt the "99" is constantly in action.

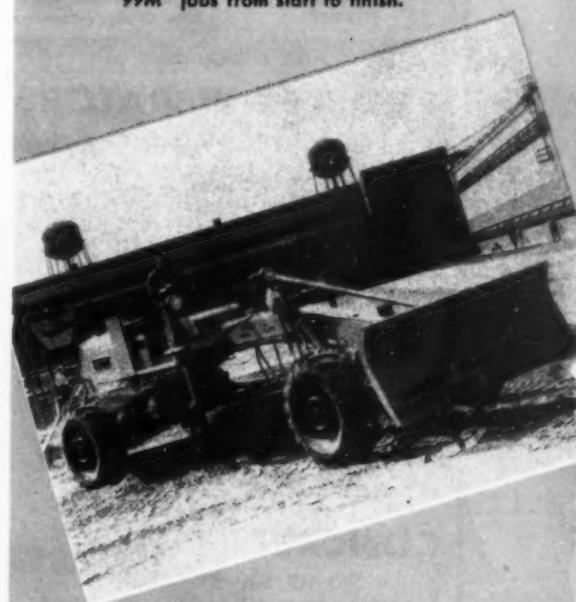


On both West and East coasts, 99M's help speed up construction of roads through new shipyards. The bulldozing attachment is effective for handling fill, for the powerful 4-wheel drive gives them traction, keeps them on the job when ordinary equipment is bogged down.

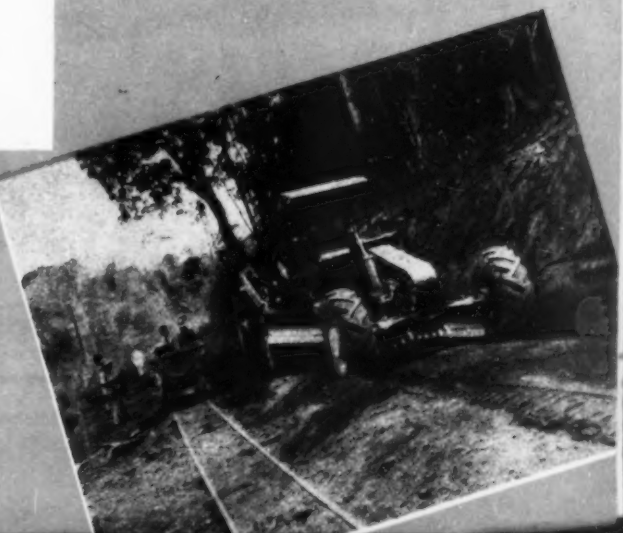
In strip mines providing ever increasing quantities of critical war materials, 99M's are successfully handling almost all road maintenance jobs... grading, ditching, spreading, and snow removal.



Builders of vital war plants are finding 99M's outstanding on the accurate grading required for form work. 4-wheel drive prevents wheels digging and spinning. Access road construction and maintenance are also "99M" jobs from start to finish.



In many lands where roads are being cut through the wilderness to tap new sources of critical materials, the outstanding performance of 99M's under grueling conditions is proving their ability to "take-it."



● Today...when excuses just don't go...when war needs make it vital to get even the toughest jobs done ahead of schedule...owners and operators are gaining a new appreciation of the 99M's ability to handle an almost unlimited variety of jobs a lot better and quicker.

Because of its exclusive features, the "99M" handles bigger loads. Its powerful all-wheel drive, power-operated steer on all four wheels, power blade shift, and effective neutralization of blade side-draft combine to clean up job after job away ahead of schedule. Its versatility and unmatched "working weight" permits the use of many practical attachments...eliminating the need for much auxiliary equipment. The "99M" keeps busy under conditions that stall ordinary rear-wheel-drive motor graders. No matter which type of job it's drafted for, this versatile Power Grader "delivers the goods" whether working in clay, sand, gravel, or loose soil...whether the footing is slippery, sloping, loose, irregular or rough.

Operating views shown here illustrate but a fraction of the types of jobs on which the 99M's are making it possible for operators on vital war construction to *deliver enough on time.*

THE AUSTIN-WESTERN ROAD MACHINERY CO.
AURORA, ILLINOIS

Austin-Western

SYNTRON

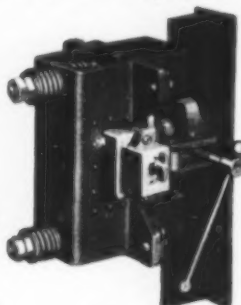
ELECTRIC TOOLS
Pay Big Dividends
in Labor Saved



ELECTRIC HAMMERS
For Drilling and Cutting Concrete
4 Models— $\frac{3}{4}$ " - $1\frac{1}{2}$ " - $1\frac{1}{2}$ " - 2" Capacities

**3600 V.P.M.
ELECTRIC
CONCRETE
FORM
VIBRATORS**

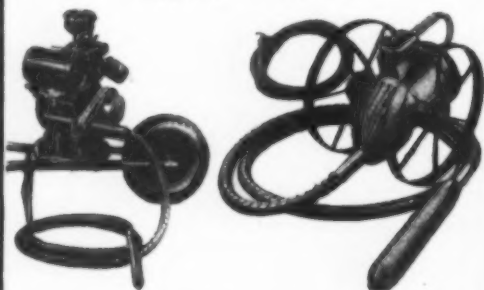
For Clamping to
Wall Sections
Sewer Pipe Forms.
60 lb. and 120 lb.
Models



120 lb. V-75 with
Vise Clamp Attachment

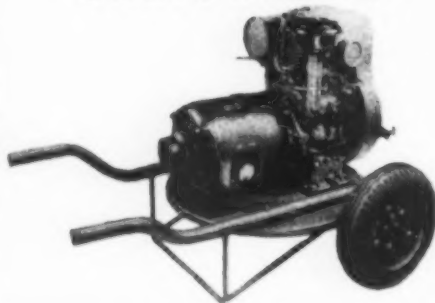
Also widely used as
HOPPER VIBRATORS

To speed up the Flow of Sand — Cement —
Lime — Concrete — Etc. thru bins,
hoppers, chutes, skips



CONCRETE VIBRATORS

3 HP Gas Engine Drive
1 HP and $1\frac{1}{2}$ HP Electric Motor Drives
Up to 31 Foot Flexible Shafts



ENGINE GENERATOR SETS
1 KVA to 15 KVA Capacities

SYNTRON CO.
500 Lexington Ave. • Homer City, Pa.



Fig. 13 . . . APPLYING NEW FACING to brake shoe, special tool stretches lining and presses it into close fit against metal to assure overall contact and concentricity of lining with shoe.

(Continued from page 135)

and glazed braking surface; check also for uniform material on opposite wheel.

(4) INSPECT BRAKE DRUMS for concentricity, scoring and grease.

(5) INSTALL BRAKE SHOE RETURN SPRINGS and set cams in released position.

(6) CHECK THE INSIDE DIAMETER of the brake drums with the brake drum gage. Set the brake shoe gage arbor (Fig. 12) so that the finger marked "drum diameter" is just in contact with the point of the brake drum gage pin. Place the proper adapter bushing on the spindle or axle shaft and slide the brake shoe gage over the adapter bushing.



Fig. 14 . . . CENTER PUNCH MARKS on these brake shoe anchor bolts must point toward each other before adjustment of brake shoe heels is made. Arrows here again indicate direction of bolt rotation to decrease clearance between heels and brake drum.

(7) PLACE THE GAGE on the point marked "heel" (Fig. 12) and loosen the brake shoe anchor bolt nuts. On Models WC and WD an arrow is stamped on the anchor bolts, but on all other models a center punch mark appears (Fig. 14). If the arrows or center punch marks on

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both anchor bolts are not pointing directly toward each other, turn the bolts until they do. These marks must point toward each other before starting to adjust the shoes. The anchor bolts must be turned, from that position, in the correct directions in order to decrease the clearance between the lining and the drum at the heels of the brake drum shoes. The correct procedure is to turn the right-handed anchor bolt of the pair anti-clockwise, and the left-handed anchor bolt of the same pair clockwise, as viewed from the side where the wrench is applied. When turning the anchor bolts, as directed, the heels of the brake shoes will move downward and outward toward the gage. Turn the anchor bolts until the heels of the brake shoes just contact the "heel" adjusting finger of the brake shoe gage arbor. The correct .006-in. heel clearance is built into the arbor of the brake shoe gage.

(8) Move the arbor of the gage to the point marked "toe" (Fig. 9) and check the clearance between the lining and drum at the toe of the brake shoe. Turn the toe adjusting cam (Fig. 9) until the lining at the toe of the brake shoe just contacts the gage arbor. The toe of the shoe is then properly adjusted with .012-in. clearance between the lining and drum.

(9) RECHECK THE CLEARANCE first at the heel and then at the toe to make sure no change has occurred in either adjustment, and tighten the anchor bolt nuts securely.

(10) INSTALL WHEEL AND HUB ASSEMBLIES.

(11) CHECK AND REFILL the master cylinder reservoir with brake fluid.

Wheel bearings properly adjusted and lubricated to handle the load hauled by the truck will contribute to long life of these units, facilitate the performance of brakes and avoid abnormal wear.

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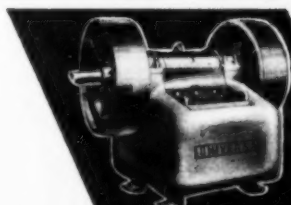


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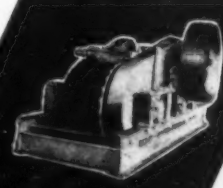
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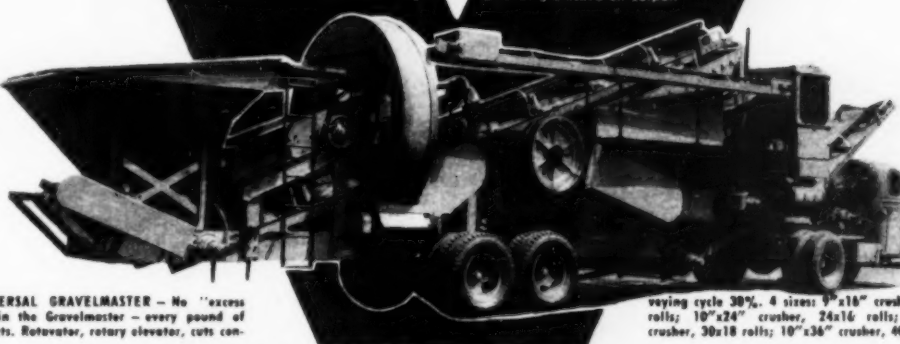


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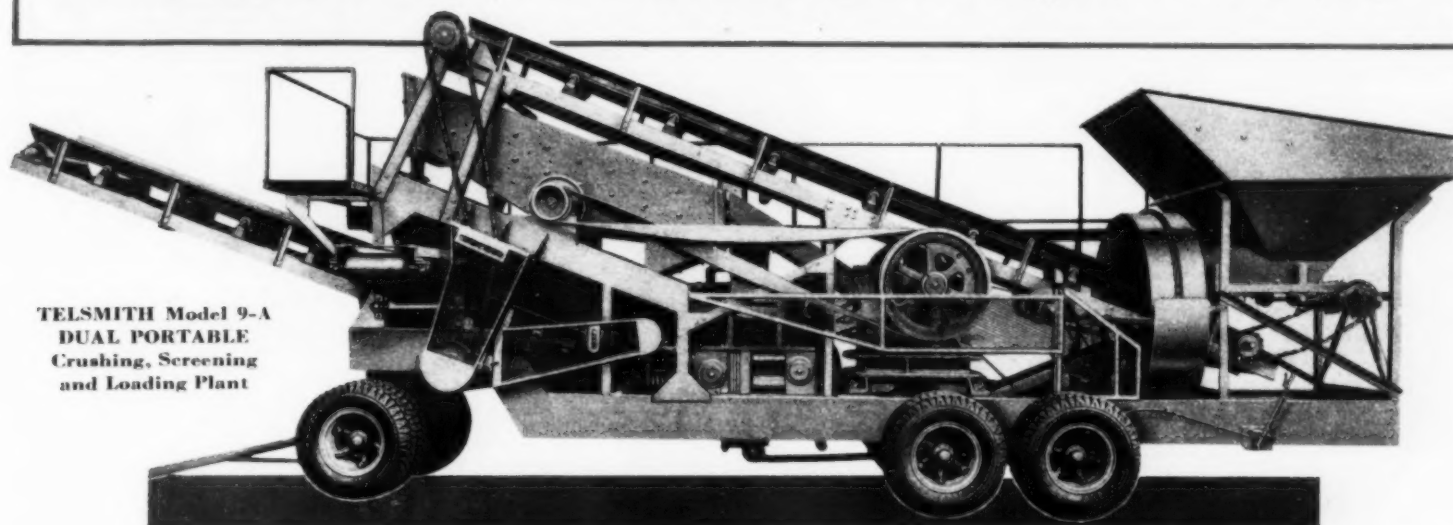
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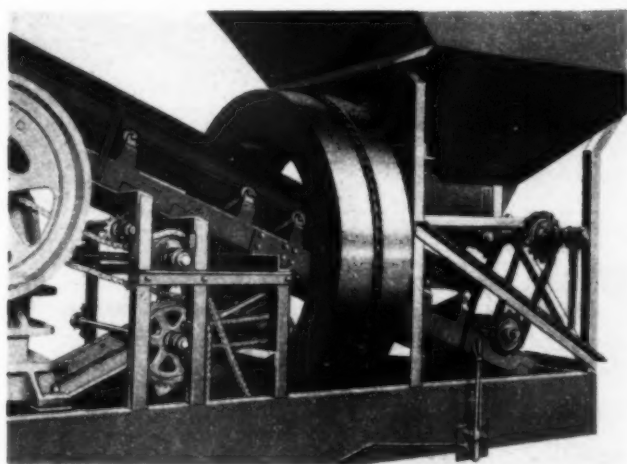
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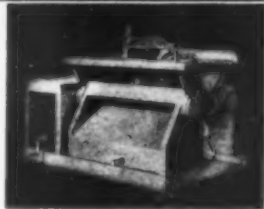


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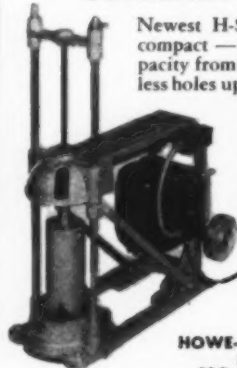
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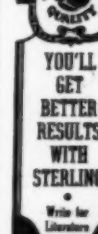


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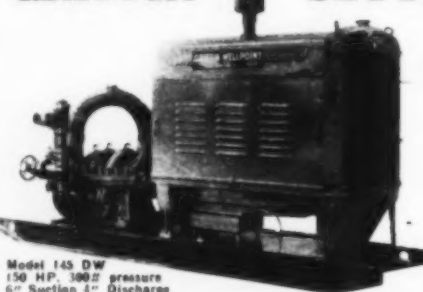
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